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SEX RATIOS AND GENDER ROLE PERCEPTIONS

by

Elizabeth A. Boger

A Dissertation

Presented to the Faculty of

The Graduate College at the University of Nebraska

In Partial Fulfillment of Requirements

For the Degree of Doctor of Philosophy

Major: Psychology

Under the Supervision of Professor Richard A. Dienstbier

Lincoln, Nebraska

May, 2013

SEX RATIOS AND GENDER ROLE PERCEPTIONS

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UNIVERSITY OF NEBRASKA, 2013

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This research investigated whether altering perceived sex ratios, defined as the number of men per 100 women, influenced gender role perceptions among college students. The specific area of interest within sex ratios was the effect of high versus low sex ratios. Existing work on the topic of sex ratios focused on demographic data.

The focus of these studies was the impact of changing sex ratios on the individual, specifically participants' perceptions of romance, dating and women's gender roles. I hypothesized that for high sex ratios, participants would endorse statements of traditional dating and romance schemes, traditional women's roles, and socially conservative statements in general. For low sex ratios, I hypothesized that participants would report relaxed notions of dating and romance, egalitarian women's gender roles, and less social conservatism.

In the pilot study, participants were exposed to a written manipulation presenting a fictional environment with an imbalanced sex ratio. Participants were asked about traditional romantic gestures, women's roles, and family structure. Results indicated that participants were responsive to the manipulation as hypothesized, although the effect was weak. Subsequent studies used a strengthened audio presentation of the information about sex ratios.

For studies two and three a fictional island society was created that had either an

excess of men or women. In study two, the manipulation focused on a fictional female character's choices regarding marriage, motherhood and career. In the third study, the manipulation focused on romance, dating, and careers without a central character.

The outcome of these studies was as hypothesized; participants in the high sex ratio condition reported greater support for traditional romance and more constrained women's gender roles while low sex ratio condition participants reported less valuing of romance and formal dating behavior and less restricted gender roles.

The overall results supported a theory of how unbalanced sex ratios affect society that was developed by Guttentag and Secord, but that has never previously been subjected to an experimental test. Implications of the outcome were discussed at the individual, local and global level.

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ACKNOWLEDGMENTS

I could not have completed this dissertation without the support of my parents, LuAnn and Bruce, my sister Becky, my friends Craig Johnson and David Simpson, and my coworkers at Rose State College, particularly John Carl.

TABLE OF CONTENTS

| | Page |
|--------------------------|------|
| LIST OF APPENDICES | vi |
| LIST OF TABLES | viii |
| | |
| CHAPTER | |
| I. INTRODUCTION | 1 |
| 1.1 HYPOTHESES | 12 |
| II. PILOT STUDY | 14 |
| 2.1 PARTICIPANTS | 14 |
| 2.2 PROCEDURE | 15 |
| 2.3 RESULTS | 17 |
| III. STUDY TWO | 28 |
| 3.1 PARTICIPANTS | 28 |
| 3.2 PROCEDURE | 29 |
| 3.3 RESULTS | 33 |

| | |
|--|----|
| IV. STUDY THREE | 41 |
| 4.1 PARTICIPANTS | 41 |
| 4.2 PROCEDURE..... | 42 |
| 4.3 RESULTS | 44 |
| V. DISCUSSION | 56 |
| REFERENCES | 69 |
| APPENDICES | |
| A. Pilot Study Informed Consent | 72 |
| B. Demographic Questions | 74 |
| C. Pilot Study Vignettes | 75 |
| D. Pilot Study Dependent Variable Items | 77 |
| E. Pilot Study Debriefing | 78 |
| F. Study Two Informed Consent | 79 |
| G. Five-Factor Personality Inventory | 82 |
| H. Map Image | 85 |
| I. Study Two Percent of Children in School Figure | 86 |
| J. Study Two Occupation Figure | 87 |
| K. Percent of Males and Females (High Sex Ratio Condition) | 88 |
| L. Percent of Males and Females (Low Sex Ratio Condition) | 89 |

| | |
|---|-----|
| M. Study Two Percentages of Males and Females by Age Group (High Sex Ratio Condition) | 90 |
| N. Study Two Percentages of Males and Females by Age Group (Low Sex Ratio Condition) | 91 |
| O. Study Two Script..... | 92 |
| P. Study Two Dependent Variable Items | 103 |
| Q. Study Two Post-Research Questionnaire | 107 |
| R. Study Two Debriefing | 109 |
| S. Study Three Informed Consent | 111 |
| T. Study Three Left-Handedness Figure..... | 114 |
| U. Study Three Age of Puberty Figure | 115 |
| V. Study Three Script..... | 116 |
| W. Study Three Dependent Variable Answer Sheet | 131 |
| X. Study Three Post-Research Questionnaire | 135 |
| Y. Study Three Debriefing | 137 |
| VITA..... | 139 |

LIST OF TABLES

TABLE

Page

| | |
|---|----|
| 2.1 PROPORTION OF WOMEN IN LAUREL COLLEGE POPULATION | 18 |
| 2.2 CORRELATIONS BETWEEN ROMANCE ITEMS | 21 |
| CORRELATIONS BETWEEN GENDER ROLE ITEMS | 23 |
| 2.4 CORRELATIONS BETWEEN CONSERVATISM ITEMS | 24 |
| 3.1 SUSPICION CHECK FOR MOTIVES IN STUDY | 34 |
| 3.2 CORRELATIONS BETWEEN DEPENDENT VARIABLE ITEMS | 35 |
| 3.3 HYPOTHESIS TEST OF DEPENDENT VARIABLE ITEMS..... | 37 |
| 4.1 MANIPULATION CHECK | 46 |
| 4.2 MANIPULATION CHECK GENDER = FEMALE..... | 47 |
| 4.3 MANIPULATION CHECK GENDER = MALE..... | 48 |
| 4.4 CORRELATIONS BETWEEN DEPENDENT VARIABLE ITEMS | 50 |
| 4.5 HYPOTHESIS TEST FOR PACE ISLANDER ITEMS..... | 53 |
| 4.6 CORRELATIONS FOR FIRST-PERSON ITEMS GENDER = FEMALE | 54 |
| 4.7 CORRELATIONS FOR FIRST-PERSON ITEMS GENDER = MALE..... | 55 |
| 4.8 HYPOTHESIS TEST FOR FIRST-PERSON ITEMS GENDER = FEMALE..... | 57 |
| 4.9 HYPOTHESIS TEST FOR FIRST-PERSON ITEMS GENDER = MALE | 58 |

CHAPTER 1

INTRODUCTION

Sex ratios refer to the number of men in a population relative to the number of women and are normally expressed as the number of men per 100 women. A low sex ratio (below 100) occurs when there are fewer men than women; a high sex ratio (above 100) exists when there are more men than women.

The topic of sex ratios suffers from a paucity of empirical focus; the main source of research on sex ratios comes from the work of Marcia Guttentag. Her writings on sex ratios rely on population statistics, both current and historical, and historical accounts of cultures ancient and modern (Guttentag & Secord, 1983). The nature of this investigation into sex ratios focused then on specific, sex ratio-imbalanced populations with the goal of highlighting the differential impact of those sex ratios on the gender roles of heterosexual women and men. To date, sex ratio research has focused exclusively on the heterosexual population, both in gender roles and in relationship patterns. Guttentag's analysis showed that the impact of imbalanced sex ratios is not the same for men and women because power is not shared evenly across genders. Men almost always hold more structural power, while women may or may not hold more dyadic power. For purposes of this analysis, structural power means influence over economic, legal and social practices. Dyadic power implies influence over the nature and direction of intimate personal relationships (Guttentag & Secord, 1983).

The impact of varying sex ratios is seen prominently as changes in gender roles, particularly in terms of women's roles (Guttentag & Secord, 1983). Societies tend to

assign particular tasks to each gender; some of these tasks or roles are fixed and rooted in biology (mother, father) while others are flexible (wage earner, caretaker) (Eagley & Wood, 1991; Hoffman & Hurst, 1990). While fixed gender roles, or more properly fixed sex roles, do not change regardless of the population's sex ratio, those roles less tied to biological necessity may vary with the demands of the population. Women's gender roles are usually the focus of study in this context because it is women's roles, as opposed to men's, that seem to change the most when a population's sex ratio changes (Guttentag & Secord, 1983).

The simplest way to view the impact of sex ratios on gender roles is through a social psychological interpretation of supply-and-demand economics. The interaction of men and women is seen as an exchange from the perspective of needed goods and services. When examined exclusively from the standpoint of supply-and-demand, the impact of shifting sex ratios should be the same, regardless of which gender is in under- or over-supply. No matter what the population's make up is, the same things need to be done—children must be produced and reared, work must be completed and so on.

In accordance with a simple application of exchange theory in a population with an unbalanced sex ratio, several key changes would occur. For the over-supplied gender, these changes would be: the age of first marriage would increase, the number of people who remain unmarried would increase, the number of divorced people would increase, and the number of divorced or widowed people who do not remarry will increase (Guttentag & Secord, 1983). The age of marriage would increase because the chance of finding a partner would decrease—there would not be enough of the other gender. Also, the undersupplied gender has more latitude in selecting a partner and thus should be in no

hurry to settle down. Because of this increased time period of adult singlehood, the unmarried pool grows larger. Lastly, divorce, namely remaining unmarried after divorce, is more common because the likelihood of the divorcing partner to find a new partner (from that pool of unmarried people) is high.

This reasoning, applied to the under-supplied gender, should result in these changes: first marriage at an earlier age, a decrease in the number of people who remain single, a smaller number of divorced people, and a smaller number of divorced and widowed people remaining in that state (Guttentag & Secord, 1983). This logic leads to the conclusion that marriage age is lowered because this gender is in undersupply and would be pursued as a possible partner as soon as they reach adulthood. Few eligible people of this gender would remain single for long, as they would be in short supply and thus in high demand. This group of people would be less likely to be divorced—or more properly, to remain divorced—as there is a plentiful group of potential partners from which to choose.

However, when we apply this reasoning to actual situations of imbalanced sex ratios, the results are somewhat different than what would be expected. When there is a shortage of men, women do marry at a later age, are more likely to be unmarried or divorced at any given time, and are more likely to remain unmarried, widowed, or divorced. When looking at the impact of this low sex ratio on men, however, the findings are in contradiction; men also marry at a later age, are more likely to be single or divorced at any given time, and are more likely to remain unmarried, divorced, or widowed (Guttentag & Secord, 1983).

The hypothetical relationship discussed above, in which shortages of either sex lead to mirror-image results, is predicated on the assumption that interactions between men and women are equal, and that men and women hold equivalent positions in the stated economy—that is, that men and women are equivalent aside from disparities of supply and demand. To date, however, there is no culture in which men and women are precisely equal; the overwhelming majority of known cultures give structural power to men (Guttentag & Secord, 1983). That is, men have greater influence and control over political, economic, and legal systems as well as social norms (Guttentag & Secord, 1983). The possession of structural power is unchanging; no matter which gender is in under- or over-supply, men keep structural power and determine societal rules. Men may amass and exert this power due to their greater physical strength and comparatively low requisite reproductive responsibility (Buss & Schmitt, 1993), as well as low risk of mortality associated with reproduction. That is, since men are stronger and are less physically tied to offspring, they can maintain structural power in those societies where they have amassed it.

What does change with the shifting of sex ratios is dyadic power—a measure of control in the continuous series of exchanges that constitutes interpersonal relationships (Guttentag & Secord, 1983). The gender in under-supply possesses dyadic power due to its relative scarcity. Since there is not enough of that gender to go around, it has the power to influence interpersonal relationships—how they are formed, their duration, and constitution—in a manner either to that gender's maximal benefit or minimal detriment. However, the asymmetry in sexual strategies between women and men renders

inadequate any simple conclusion derived from the idea that being in undersupply increases dyadic power.

Return for a moment to the supply-and-demand interpretation of sex ratios, but this time from the perspective of structural power. The structural power hypothesis would predict that in a low sex ratio situation, men, who control their own destiny and have many potential women from whom to choose, would incur first marriage at a later age, be more likely to remain single, be more likely to be divorced at a given time, and be more likely to remain divorced or widowed (Guttentag & Secord, 1983). In a low sex ratio situation, men possess both structural and dyadic power. With both types of power resting in a single gender, that gender (men) has the resources to shape the direction and form of relationships. Thus, men have the freedom to express their greater sexual flexibility and are likely to do so by expressing less commitment to a single partner, and, when men make commitments, at a more advanced age. Indeed, while men in low sex ratio situations do marry, they do so at a later age (Kruger & Schlemmer, 2009). As there is no shortage of available female partners, men have little impetus to select a single partner for a long-term, if not lifelong, relationship. Plenty of alternatives exist for men in this situation. While women lose dyadic power when the sex ratio is low, they may stand a chance of acquiring a little more structural power as they take advantage of newly-opened avenues to workforce and political participation. Thus while women may suffer a decline in their power to shape the trajectory of their romantic partnerships, they may choose to gain influence in other arenas.

The sex ratio of the total US population (including all ages) has shifted from an historic high of 106 (1910) to a current ratio of 97 (2010). Until around 1945, the

population's sex ratio was consistently high, varying between 102 and 106—there were more men than women in the population. After approximately 1945, the sex ratio never rose above 100, and in fact dropped quickly from around 100 in 1945 to 95 in 1970, indicating that there were more women than men. Since 1970, the sex ratio has wavered between 94 (1980), 96 (1975, 2000), and 97 (2010) (United States Census, 1900-2010).

Thus, those people growing up after World War II have always lived in a society with more women than men, including baby boomers and all younger generations. While the general population seems to have stabilized at the 95-96 level and has stayed in that range since 1970, the sex ratio of college campuses has shifted far more dramatically. In 1950, college populations had a sex ratio of around 230. By 1980, that number had dropped steadily to just under 100. As of 1997, the sex ratio of college populations was at 79 (Glenn & Marquardt, 2001). By 2010, the sex ratio had dropped to 75, although it does appear to be stabilizing (ACE, 2010). Males are continually underrepresented in college populations as more women attend college compared to men, a trend that does not appear to be reversing. As more women earn degrees than men do, the demographics of marriage change. Men's likelihood of holding higher educational status than their wives is being eroded; in 1997, just 4% of women had more education than their husbands while by 2007, 22% of women were more educated than their spouses (Cohn & Fry, 2010).

It is worth noting that in current US society, adult men and women continue to state lasting marriage as an important personal goal (Schmiege, Richards, & Zvonkovic, 2001; Booth & Edwards, 1992; Glenn & Marquardt, 2001), and one to which they actively strive. However, in recent years both men and women have become more

pessimistic about the likelihood of obtaining that goal in the face of steady though somewhat high divorce rates (Glenn & Marquardt, 2001).

Guttentag and Secord's method of analysis is useful in examining the marked changes in college culture, particularly dating and relationship practices. This analysis may help reveal that these changes in dating are influenced by the changes in campus population. Much as in Guttentag and Secord's groups of interest, the status of and outcomes for college women have changed dramatically in parallel with changing sex ratios.

At the same time, notions of romance and dating on college campuses have changed dramatically (Glenn & Marquardt, 2001). Prior to the drop in sex ratios on college campuses from 230 to 75, dating during these years was a highly traditional affair. Men expressed their interest in women and asked them on dates, for which they invariably paid. Romantic gestures were relatively common, with the provision of flowers, candy, gifts, and the like from men to women. Women may have shown initial interest in several men and handled them accordingly; a date was typically not a last-minute endeavor but rather one set several days in advance. Women in this scenario had considerable dyadic power; they were in very short supply and could dictate the nature of the progression of relationships (Guttentag & Secord, 1983). The choreography of dating was tightly controlled, but it allowed a measure of control for women that let them minimize unfavorable outcomes.

Because women are consistently operating from a position of lower structural power, the techniques used by them to exert control when they possess dyadic power differs significantly from those used by men (Okami & Shackelford, 2001). By

controlling the frequency and nature of dates, women could protect their reputations, screen potential suitors, and perhaps obtain the best companion from the available pool of options. Men were obliged to participate in this scheme, as there were fewer women than men and thus each available woman could have several men from whom to choose (Guttentag & Secord, 1983). It was only by accepting the strictures of dating set forth that they could participate in the selection of a companion.

These traditional dating schemes reinforced cultural norms for gendered behavior. At the time, the overall population had a high sex ratio and thus a traditional culture (Guttentag & Secord, 1983). Women were most highly prized for their roles as homemakers and mothers and as such, their virtue was well guarded. The dating drama of college life helped maintain this cultural norm by allowing women to test out potential companions while maintaining their good reputations; in a highly structured dating scene they were somewhat less likely to incur the pejorative labels associated with libertine behavior. Thus, while women could not engage freely in the type of sexual behavior sometimes attributed to men, they could exert a measure of control over their relations with men to maximize their own outcomes.

However, campus sex ratios have changed dramatically since those days from 230 in 1950 to 75 in 2010. Coincidentally, traditional dating behavior has diminished significantly on college campuses. Men and women are far more likely to “hang out” in large, mixed-gender groups where interpersonal interaction is less clearly defined. Instead of set activities that are clearly labeled as dating or friendship-related, young men and women interact in a broad spectrum of casual social situations. While this type of activity does increase social contact between men and women, it provides little concrete

information for women's standing with men. That is, unlike in traditional dating scenes, women are not sure whether they have a man's interest or whether he is invested in any relationship they do have. Men are also less compelled to spend large sums of money wooing women; why would they, when there are many women from which to choose and relatively few men competing for them? Even if women would like to be the recipient of dates, gifts, and romantic gestures, men have no reason to engage in such behaviors. If a particular woman refuses to enter into a relationship with a man because he does not follow a traditional dating scheme, he can move on to another woman with relative ease (Glenn & Marquardt, 2001).

The casual social scene that has supplanted traditional dating on college campuses, then, appears to serve men more than women. Men may pick from a selection of partners and those women are at a disadvantage to elicit any sort of commitment from the men. Indeed, many women report experiencing reticence in finding out from men the status of any relationship out of fear that merely asking will end what little connection they currently have (Glenn & Marquardt, 2001). As men have little reason to be exclusive with one woman, such an expression of potential monogamy may, in fact, be a cue to end a relationship. Men do marry eventually, but at an age significantly past the traditional college years (Kruger & Schlemmer, 2009).

Women in this situation, however, find themselves in a quandary. Without the structure of traditional dating, it is difficult for women to determine which men, if any, are genuinely interested in them. Whereas before, women could withhold sexual and emotional intimacies until relatively late in a relationship's development, on the grounds that any early push for such activities could be used to end that relationship and move on

to another man, in the current situation women find themselves less able or willing to do so. Many women report that they engage in some form of sexual or emotional intimacy, although not necessarily sexual intercourse, in the absence of a well-defined relationship. Hooking up, and the many permutations of this standard of social interaction, is in many cases the only type of so-called dating behavior that many college students experience. When asked, half of college women reported going on six or fewer dates during all their college years—with a third of them going on two or less. Some women expressed uncertainty as to whether the activities they had participated in were dates or not (Glenn & Marquardt, 2001).

Also telling is the fact that fewer women are finding future spouses while in college. Although many women report this as a goal of their college experience, in recent years it has been a goal less and less reached (Glenn & Marquardt, 2001). The average age for first marriage for both men and women has increased steadily from a national low in 1960 of 23 for men and 20 for women. This change is in line with the overall population's continued low sex ratio, and is currently outside of traditional college ages for both men (27) and women (25) (United States Census, 2000). Glenn and Marquardt's findings regarding the decline of traditional relationships in college is unsurprising given Guttentag and Secord's theory of sex ratios. College men, in serious undersupply, hold dyadic power and determine the course of relationships in a manner that best serves their goals—goals that may not include marriage and its attendant expectations of monogamy.

Sex ratio theory, as posited by Guttentag and Secord, was developed alongside their analysis of historical and contemporary records. As such, they did not provide

empirical tests of their theory but instead relied on archival data and their interpretation of historical accounts, opening their work to accusations of bias. Similar analyses of modern cultures such as India and China appear to support Guttentag and Secord's work, but these attempts suffer the same weakness. Very little psychological research has been done investigating sex ratios' impact on gender roles, most of it focusing on mate preferences (Stone, Shackelford, & Buss, 2007). Glenn and Marquardt's study of dating and college women makes no reference to Guttentag and Secord's sex ratio theory, but their research findings conform to the predictions sex ratio theory would make regarding the campus dating scene.

While knowledge of sex ratios is important to understanding whether and why a culture is traditional or non-traditional, sex ratios are not the only force influencing such cultural characteristics. In a culture where structural power is firmly and strictly held by men, the shifts in dyadic power caused by sex ratio changes may not lead to significantly greater egalitarianism. In countries such as Saudi Arabia, where traditional culture is strictly enforced, shifting sex ratios are not likely to lead to new social roles for women nor to a relaxing of gender role proscriptions. On the other hand, in a country such as China, where egalitarianism is more or less explicitly stated in the country's government, changes in sex ratios are likely to impact women's dating and marriage opportunities more than their work and social advancement changes. Clearly, sex ratios are not the only force acting on gender role perceptions. Culture and sex ratios can interact, where culture drives sex ratios, such as by enhancing the survival of one gender over the other, after which the imbalanced sex ratio influences culture in turn. Given that such a large percentage of the world's population, over one-third, live in rapidly developing, sex-

ratio-unbalanced areas such as India and China, it is important to understand the impact of sex ratios on these cultures even though sex ratios are not the only social factor impacting the populations.

1.1 HYPOTHESES

The previously described effects of unbalanced sex ratios should be reflected in various social settings, including the modern college campus. Thus, a change in the sex ratio of a campus population should be reflected in changed perceptions of gender roles for the students on that campus, including roles for dating behavior. Specifically, when the sex ratio is high, views on dating should be more traditional and structured due to women's possession of dyadic power. Both men and women should express more traditional gender roles, although men's expression of these roles should be stronger than for women. When the sex ratio is low, views on dating should be less traditional, unstructured, and less defined due to men's possession of dyadic power. Both men and women should express more egalitarian gender roles. The effect of imbalanced sex ratios is expected to be greater in women than in men. Given that men always possess structural power and thus exert greater influence on social norms, the impact of shifting ratios is smaller in the short term. Women bear the brunt of gender role changes due to shifting sex ratios, thus they will show a greater sensitivity to an implied change in population. The effects of experimental manipulation, participant gender, and baseline gender role beliefs will be evaluated using analysis of variance. I hypothesized that exposing participants to a fictional, but familiar, situation (a college campus) would shift

their gender role perceptions in the same way that actually being in a sex ratio-unbalanced situation would. Although this type of manipulation, which does not include a change in the participants' actual environment, may be less powerful than a more direct manipulation, I hypothesized that it would be strong enough to elicit the sex ratio effect.

Hypermasculinity and hyperfemininity should serve as a moderator variable. The effects of imbalanced sex ratios should be neutralized by hypermasculinity or hyperfemininity because these extremes indicate an excessively rigid and misogynistic view of sex roles that are largely unaffected by outside input. Hypermasculinity and hyperfemininity are not simply the upper and lower boundaries of gender role perception, but rather a sex role orientation unto themselves (Murnen, Wright, & Kaluzny, 2002; Murnen & Byrne, 1991). These two orientations focus less on the roles that men and women fulfill in society and more on a perception of conflict and competition between and within the sexes. As such, people with these orientations should be less influenced by sex ratio changes because their sex role perceptions are based on a different set of norms than other people are.

CHAPTER 2

PILOT STUDY

2.1 PARTICIPANTS

One hundred eighty participants, 41 male and 139 female, were recruited from the University of Nebraska-Lincoln undergraduate psychology student population via the Experimetrix online recruitment program. The average age of the participants was 19.75 years ($SD = 2.68$). Four students reported being older than 25; excluding them made no difference in the analyses. Most of the students were White ($n = 154$) or Asian ($n = 14$), while the rest were Black ($n = 6$) or Latino ($n = 5$). One person declined to answer the question. Students were offered one hour of experiment credit for their participation. Upon arrival, students were informed that the study concerned social contexts in a small liberal-arts college. They were informed that they would fill out some standard demographic and social schema questionnaires and afterwards read a vignette about a small college and then answer questions about what they read. No mention was made of sex ratios, dating or gender roles in the recruitment literature, informed consent, or initial instructions given to students.

2.2 PROCEDURE

This study was designed to be completed via computer. Participants' informed consent forms were signed electronically and stored in a database separate from all experimental data (Appendix A). After providing informed consent, students filled out a series of questionnaires on the computer. The first set of questions consisted of demographic items, including age, gender, ethnic group status, income, and marital status (Appendix B). The second set of questions was actually two sex role questionnaires (the Sex Role Inventory or SRI and the Traditional-Egalitarian Sex Role or TESR). The SRI was developed by Brogan and Kutner (1976) while the TESR was the work of Larsen and Long (1988). The questions for these two surveys were embedded in a series of filler items so that participants did not develop an expectation for sex role questions. The goal of using these two scales was to measure participants' baseline gender role perceptions.

After completing the questionnaires, participants were given a filler task that consisted of sorting a list of 30 unfamiliar words, a task that took about five minutes. They were told the task was cognitive in nature, although its actual use was to distance the sex role questions from subsequent tasks to avoid contamination. Following the filler task, participants were presented with a vignette describing what the participant's life would be like at a fictional liberal arts college, Laurel College (Appendix C). Each participant was randomly assigned to one of three conditions: a control condition, a high sex ratio condition with too many men, or a low sex ratio condition with too many women. Each description of this college began with information on social activities students there enjoy, such as movies, shopping and restaurants. In the control condition,

the description moved directly to a statement regarding the student entering into dating life on campus. This statement was included to provide a clear transition to the follow-up questions presented afterwards. In the high and low sex ratio conditions, the description of the college was more detailed. Participants were told the college had been single-sex for most of its history (either all-male or all-female) and had only recently opened its doors to the other gender, resulting in a student population that was markedly lopsided, although no specific sex ratio was given. These two vignettes ended with the same transition involving an entry into dating and relationships.

The dependent variable questions were described as referring to the social context of the college to prevent an immediate suspicion of the gender role content of the questions (Appendix D). Answer options were presented on a seven-point Likert-type scale, with the anchors *strongly agree* as seven and *strongly disagree* as one. The questions measured the sex ratio manipulation across three dimensions: romance, gender roles, and conservatism. Romance questions, such as *a very romantic way to show affection for a woman is to give flowers or candy*, focus on whether a sex ratio manipulation alters participants' perceptions of what is typical or common romantic behavior. I hypothesized that participants in the too many men (high sex ratio) condition would agree more strongly with items reflecting traditional dating behaviors, while participants in the low sex ratio condition would reflect the more relaxed and ambiguous romantic patterns Guttentag and Secord (1983) expected. Likewise, responses to the gender role items should follow a similar pattern, with participants in the high sex ratio condition endorsing traditional gender role items such as *it's been my experience that things work best when fathers are the head of their families*. Answers in the low sex ratio

condition were hypothesized to agree less with this type of statement. The third dimension, conservatism, was reflected in items like *the high rate of divorce in our country is a sign of the decay of values*. The items in this dimension focused on conservatism in gender roles, as opposed to conservatism in general. I hypothesized that participants in the high sex ratio condition would agree more with these conservatism statements than would participants in the low sex ratio condition. Most of the dependent variable items were written to reflect the high sex ratio condition. That is, most of the statements reflected traditional romance and gender role behaviors. A few items were written from the low sex ratio perspective.

After the dependent variable items, participants completed a hypermasculinity or hyperfemininity scale, depending on participant gender. The hypermasculinity scale was developed by Mosher and Sirkin (1984) and the hyperfemininity scale by Murnen and Byrne (1991). These scales were renamed “Gender Schematic Scale” to remove the influence of the term *hyper*, which might alert participants that the scale measured extreme positions on these topics. Participants were then debriefed (Appendix E) and thanked for their participation.

2.3 RESULTS

The pilot study was the only study completed with a gender-neutral control group. I abandoned this control for the subsequent two studies, as it did not provide meaningful comparisons to the two experimental groups. There were 17 dependent variable items, including one free-response manipulation check and 16 hypothesis-testing items.

MANIPULATION CHECK

A single, free-response manipulation check item was included in the dependent variable questionnaire, *what percentage of students at Laurel College are women*. These responses were coded as either too many women, too many men or equal numbers of men and women. Twenty-three participants did not provide a response. There was a significant effect for condition, $X^2(4) = 158.79, p = .0001$. The pattern of responses was in the hypothesized direction, as participants in the low sex ratio condition reported that less than half the population of the fictional college was women, while participants in the high sex ratio condition reported that more than half the population was women (Table 2.1).

In the high and low sex ratio conditions, only a small number of participants reported a proportion of women that did not match their experimental condition, five in each experimental condition. Including these participants made no difference in the analysis. Excluding the control condition, the manipulation check still yielded a significant effect for condition, $X^2(3) = 101.51, p = .0001$.

Table 2.1

Proportion of Women in Laurel College Population

| <u>Condition</u> | <u>Proportion of Women</u> | | |
|------------------|---------------------------------------|--|---------------------------------------|
| | <u>Less than</u> <u>half women</u> | <u>Equal number</u> <u>of women</u> | <u>More than</u> <u>half women</u> |
| Control | 7 | 18 | 10 |
| Low Sex Ratio | 68 | 4 | 1 |
| High Sex Ratio | 3 | 2 | 45 |

HYPOTHESIS TESTING

Sixteen dependent variable items were used for hypothesis testing. Three distinct categories were determined using a rational method (i.e. items that looked like they were related were grouped together). Those categories were romance, gender roles, and conservatism. Each category was analyzed separately in order to get the clearest picture of where the sex ratio manipulation was most impactful. A factor analysis was performed, but it was not illustrative. Since the dependent variable items were designed to measure different aspects of the sex ratio effect, I had no expectation that clear underlying factors would emerge, and they did not. Also, the sample size was too small to allow much confidence in any outcome.

ROMANCE

Four romance-focused dependent variable items, such as *hanging out with a mixed group of friends is preferable to dating*, were analyzed using MANOVA. Prior to the MANOVA, the items were analyzed for evidence of correlation (Table 2.2). Each of the four items correlated with at least one of the other items, although no single item correlated with all of the others, so all four items were used.

The model was not statistically significant, $F(8, 346) = 1.31, p = .23, \eta^2 = .03$, power = .60. A single item, *hanging out with a mixed group of friends is preferable to dating*, was significant, $F(2, 176) = 3.24, p = .04, \eta^2 = .04$. The direction of the effect was as hypothesized; people agreed with more traditionally romantic statements if they were in the high sex ratio condition, 3.42 ($SD = 1.40$), than in the low sex ratio condition, 4.09 ($SD = 1.70$), or the control condition, 3.57 ($SD = 1.67$). An environment, even an imagined environment, with a shortage of women was associated with traditional, rigid dating patterns. In an environment with a shortage of men, the strictures of dating loosened into the familiar hanging out. The effect size, was also modest, with 3.5% of variability accounted for. Power was also low (.61). Likewise, effect size and power for the overall model was low.

Excluding the control condition changed the significance of the MANOVA model, $F(4, 133) = 2.58, p = .04$. Effect size also increased, $\eta^2 = .07$. Power increased modestly, to .72, although it was still low. Including the control condition did not improve the model, as this model was significant without the control condition but nonsignificant with it. Inclusion of the control condition weakened the analysis of the model.

Table 2.2

Correlations Between Romance Items

| Item | 2 | 3 | 4 |
|--|-------|-------|------|
| 1. Hanging out with a group of friends is preferable to dating† | -.16* | -.07 | -.07 |
| 2. Men should be the initiators of romantic relationships | | .70** | .14 |
| 3. In romantic relationships, men should do the initiating and pay for the dates | | | .17* |
| 4. Men should act like gentlemen during dates | | | |

Note. † reverse-scored

* $p < .05$

** $p < .01$

GENDER ROLES

Five gender role-focused dependent variable items, such as *marriage is the most natural goal for a young woman*, were analyzed with MANOVA. Prior to the

MANOVA, the five items were analyzed for correlation (Table 2.3). All five items correlated with the other items, with a single exception. The five items were retained for the MANOVA.

The model was not statistically significant, $F(10, 344) = 0.65, p = .78$. The effect size for this model was low at $\eta^2 = .02$ or 2%. Power was extremely low, at .34. The means for each item in the model were consistently in the hypothesized direction, where the high sex ratio condition reported higher means than the low sex ratio condition. The model itself suffered from insufficient power given its modest effect size. Excluding control-condition data did not change the outcome of the analysis.

CONSERVATISM

Conservatism-focused dependent variable items, such as *the high rate of divorce in our country is a sign of the decay of values*, were entered into a MANOVA. As with previous models, the selected dependent variable items were inspected for correlations. All of the items correlated with at least three other items, so all were included in the model (Table 2.4).

Table 2.3

Correlations Between Gender Role Items

| Item | 2 | 3 | 4 | 5 |
|--|-----|-------|-------|-------|
| 1. Women who pursue professional careers are often selfish | .10 | .30** | .34** | .40** |
| 2. It is natural for a mother to play a more direct role in the care and education of her children | | .27** | .34** | .17* |
| 3. Marriage is the most natural goal for a young woman | | | .43** | .39** |
| 4. It's been my experience that things work best when fathers are the head of their families | | | | .39** |
| 5. Women in the military should not be placed in dangerous situations | | | | |

Note. * $p < .05$ ** $p < .01$

Table 2.4

Correlations Between Conservatism Items

| <u>Item</u> | <u>2</u> | <u>3</u> | <u>4</u> | <u>5</u> | <u>6</u> | <u>7</u> |
|---|----------|----------|----------|----------|----------|----------|
| 1. I think it's okay for unmarried men and women to cohabitate† | .14 | .09 | .25** | -.01 | .42** | .28** |
| 2. Even if you have children at home, it is better to divorce than to stay in a marriage full of conflict† | | .34** | .29** | .19 | .24** | .28** |
| 3. People who cannot make marriage work are weak | | | .31** | .22** | .19** | .37** |
| 4. The high rate of divorce in our country is a sign of the decay of values | | | | .18* | .29** | .30** |
| 5. Most of the young people I know who have taken advantage of today's greater freedom have messed up their lives | | | | | .06 | .42** |
| 6. I know from my own experience that life would be meaningless without my family religion | | | | | | .32** |
| 7. My contact with nontraditional families in which everyone is more equal than usual has convinced me it is basically a bad idea | | | | | | |

Note. † Reverse-scored * $p < .05$ ** $p < .01$

The model was not statistically significant, $F(14, 349) = 1.04, p = .41$. The effect size was modest, at $\eta^2 = .04$ or 4.1%. Power was low, at .66. A single item, *people who cannot make marriage work are weak*, was significant, $F(2, 176) = 4.34, p = .02, \eta^2 = .05$, power = .75. As hypothesized, this statement elicited strongest agreement from people in the high sex ratio condition, 3.10 ($SD = 1.87$), and weakest agreement from people in the low sex ratio condition, 2.26 ($SD = 1.36$), with the control condition, 2.59 ($SD = 1.66$), in between. People exposed to a high sex ratio condition, where women are at a premium and men must compete with them, were more likely to endorse the marriage statement. In the low sex ratio condition, agreement was much lower—as hypothesized. When there are too many women, marriages are more unstable. As with previous items, the effect size was small and the power insufficient. Excluding the control-condition data made no difference in the outcome of the analysis.

CONTROL CONDITION

The inclusion of a control condition, initially included to provide a baseline or benchmark for the effects of the sex ratio manipulation, made a difference in just one of the three MANOVA models. As the control condition did not prove to be a necessary baseline for comparison and thus added an unneeded third condition, it was eliminated in future studies.

The results of the pilot study suggested that the effect of sex ratio manipulation, while low, was present. The effect was there—changing the apparent sex ratio of an imagined setting was associated with matching changes in various aspects of gender role

perception. The individual items that showed significance were also ones that aimed most directly at the hypothesized shift in perception. In the romance dimension, a shift toward or away from a casual hook-up dating model as opposed to a rigidly defined dating ritual, a hypothesis that aligns with Glenn and Marquardt's work, was confirmed. In the conservatism dimension, the item that was significant confirmed on one of the important hypotheses inspired by Guttentag and Secord's work—that the perceived stability of marriage is influenced by sex ratio.

However, the data analysis also pointed to insufficient power for the effect sizes found. While changing the apparent sex ratio of an imagined situation effected a change in the gender role perceptions of participants, the clarity of that change was muted by design weakness. The effect was real, but required a more powerful experimental design in order to be thoroughly investigated. Much of the problem weakening the outcome was directly caused by an insufficient manipulation, as participants were less likely to pay close attention to a brief manipulation that they were asked to read. The manipulation itself was, perhaps, too brief. Very few statements were made indicating the impact of sex ratio imbalances; there was no improvement by repetition in the manipulation. Given the brevity of the manipulation, and its inherent passivity, much of the effect may have been drowned out by the other material participants were asked to complete.

The use of two sex role inventories, along with filler items, resulted in a questionnaire long enough to be tiring, as participants could be observed visually disengaging from the form, yawning and generally expressing boredom. Once their attention was lost, regaining it through the vignette manipulation was difficult. What little benefit possibly gained by including the sex role inventories and the

hypermasculinity/ hyperfemininity scales may have been negated by their cognitive burden on the participants. The filler task was unnecessary as well, given that the participants were not likely to have noticed any similarity between the content of the sex role survey and the remainder of the experiment.

Since the sex ratio effect was present but suffered from a weak design, I shifted the focus and format of the next study to increase the strength of the manipulation and decrease distracting and extraneous materials. Instead of a brief and passive manipulation, the next study required a format both more demanding of participants' attention and more emphatic in its presentation of imbalanced sex ratios. Reading small amounts of material produced a weak effect, so I altered the manipulation to a longer, more involved audiovisual one. A more extensive manipulation of sex ratios, embedded in a more compelling presentation, could meliorate some of the problems in this first, pilot study. Given the problem of attentiveness in the effectiveness of the manipulation, I decided to include a measure of conscientiousness in the next study. I was also curious as to whether participants were cognizant of the nature of the sex ratio manipulation, so I decided to include some suspicion-checking items as well.

CHAPTER 3

STUDY TWO

3.1 PARTICIPANTS

One hundred ninety-eight participants, 135 female and 63 male, were recruited from the University of Nebraska-Lincoln undergraduate psychology population via the Experimatrix online recruitment program. Their average age was 19.78 years ($SD = 1.74$). Most students were 19 or 20 years old, while the oldest was 29. One student did not answer the question. Most of the students were White ($n = 170$) or Black ($n = 11$); the rest were Asian ($n = 7$), Latino ($n = 5$), or Native American ($n = 2$). Three students did not answer the question. Students were offered one hour of experiment credit for their participation. Upon arrival, students were informed that the study concerned personality, culture, and career choices. They were told that following some standard demographic and personality questionnaires, they would listen to a description of a person living in society and then answer some questions about that person's life choices. No mention was made of sex ratios, dating, or gender roles in the recruitment literature, informed consent, or initial instructions given to students.

3.2 PROCEDURE

After obtaining informed consent, participants completed demographic questions regarding their age, gender, marital status, income, and ethnicity (Appendix B). They also completed a personality questionnaire composed of 60 items selected from the International Personality Item Pool (IPIP), chosen to measure the five-factor model of personality (Appendix G). The IPIP is a publicly available pool of questions probing various personality traits from established models, with the stated goal of assisting academic research on personality traits that would otherwise be measured with costly proprietary scales (Goldberg, et al., 2006). The items chosen were previously used in research on personality using the same participant population (Pytlik-Zillig, 2001). I was most interested in conscientiousness. My prediction was that low-conscientiousness participants paid less attention than high-conscientiousness participants did. In addition, the personality questionnaire also served as a distracting filler activity that reinforced the cover story.

In this study, the primary independent variable was an audio recording describing a person living in a fictional island culture (Appendix O). The description of this culture was similar enough to existing island cultures to sound familiar, but not so similar that participants would assume the recording was referring to an actual location. The point of using this fictional culture was to avoid activating stereotypes about a particular culture. Half of the participants heard a description of a culture with too few men, while the other half of the participants heard a description of a culture with too many men. Those distinctions were accomplished by altering the gender mentioned in the script. The script

itself did not refer to specific sex ratio-related topics, such as relationship stability and employment opportunities. The recording lasted approximately 15 minutes and was made by one male and one female.

The two actors alternated speaking in a somewhat formal, if conversational, manner about various aspects of this island culture, with an emphasis on economy, employment, and careers. The script began with a broad description of the island's climate, location, and features. As the script progressed, additional details were added about the island's population, such as common career interests. These details were presented to further the cover story, helping to ensure that when sex ratios were mentioned they did not stand out as the only detailed information provided about the culture. To enhance the effect of this information, each participant received a folder containing maps, charts, and graphs alleging to refer to the island and its people (Appendices H-N). The materials were ordered so that they both followed the script and reinforced the manipulation, starting with a map and concluding with a chart detailing a long-term disparity in sex ratio among the islanders. The recording made specific mention of each item so that participants had visual reinforcement of the auditory sex ratio manipulation. The only difference in this material between the conditions was the gender disparity on certain charts; the same numbers were used but the genders were reversed to show too many women or too many men. Each actor spoke for approximately equal amounts of time. The two conditions were recorded simultaneously to minimize differences in voice, pacing, and content. Only the specific parts of the script pertaining to sex ratios were different between the two conditions. The script itself mentioned an at-birth sex ratio of 10 boys to 15 girls (or 10 girls to 15 boys). One of the

graphics provided to the participants showed the population sex ratio across several decades, always hovering around 60% of either women or men, depending on the condition. The script was written to avoid gender-stereotyped speaking roles. The female and male actors shared equally the topics of careers, education, and relationships without either gender making statements alluding to gendered stereotypes. Thus, the recording sounded more like a voiceover from a documentary and less like a casual chat. The goal of this aspect of the recording was to emphasize gender disparity without distracting the participants with stereotyped gendered language by the speakers. The general tone of the recording was serious, if not grave, to reinforce the importance of its content.

In this study, the focus was on a single fictional person and the effect sex ratios would have on her life choices. The focus on a single individual was chosen in order to reinforce the importance of sex ratio disparities in an individual's life. The fictional character was similar to the wider population of young adults, so it was easier for participants to identify with her. The choices she faced (career or family) are one faced by many young adults. Half of the participants heard a description of a culture with too few men, while the other half of the participants heard a description of a culture with too many men. The aforementioned character was introduced soon thereafter and became the focus of the recorded conversation. The central fictional character, a young woman named Naomi, displayed characteristics familiar to the participant population. She was of their age range (18-25) and was considering whether to begin a family or pursue a career. This discussion of her decision completed the manipulation that originated in the mention of sex ratio imbalance in the island population. The script focused on the

difficulty of the decision Naomi faced—whether to pursue a career in science writing or begin a family with her boyfriend Sam. In the high sex ratio condition, the script made clear that if Naomi left the island to pursue her career, there would be men available when she returned. In the low sex ratio condition, however, the script stated that Sam would not wait for her and that she might not find a partner upon her return. The discussion of Naomi's life and impending decisions were both the manipulation and part of the cover story, as the sex ratio imbalance was in the context of her life choices.

After listening to the audio recording, participants answered a series of questions about Naomi's career and family options (Appendix P). The format was a Likert-type scale where each anchor point was accompanied by a specific phrase, ranging from very egalitarian on one extreme, *I would urge her to become a science writer*, to neutral in the middle, *I would suggest she be a writer but also that she consider marriage instead*, to very traditional at the opposite extreme, *I would urge her to choose marriage/motherhood*. This format was repeated, substituting Naomi's mother's viewpoint instead of the participant's, *Naomi's mother would urge her to become a science writer*. The last iteration used Naomi's father's viewpoint, *Naomi's father would urge her to choose marriage and motherhood*.

Participants were then asked what they thought would be best for the island, *it would be best for Pace Island if young women like Naomi all chose career paths*. They were also asked to rate Pace Island on its romance and the stability of its marriages. Last, participants were asked to rate how happy Naomi would be with the two possible paths she had to choose from and how much the community would value her in those roles.

After completion of the dependent variable measures, participants were provided with a post-experiment questionnaire (Appendix Q) and a prepared debriefing statement (Appendix R). This questionnaire asked whether participants suspected any manipulation and provided an opportunity for participants to detail their suspicions via an open-response item.

3.3 RESULTS

SUSPICION CHECK

A number of questions measured participant's suspicions regarding the purpose of the study. The primary one, *before starting this form, did you develop any ideas that this study was about something other than what the researchers described to you*, indicated that most participants did not develop suspicions during the study. Twenty-five students answered positively. Open-response items following each question allowed participants the opportunity to describe their suspicions. One hundred fifteen people responded; of those people, 25 mentioned sex ratios. Excluding either the 25 individuals who answered positively to the first item, the 25 who answered positively to the open response item, or answered both positively did not make a difference in the hypothesis testing statistics (Table 3.1). Positive answers to this question were evenly distributed between men and women.

Table 3.1

Suspicion Check for Motives in Study

| <u>Item</u> | | <u>Yes</u> | <u>No</u> |
|--|--------|-------------|--------------|
| Has anyone other than the researchers | | | |
| told you anything about this study before | Male | 1 (1.59%) | 62 (94.41%) |
| you came here? | Female | 2 (1.50%) | 131(98.50%) |
| Before starting this form, did you develop | | | |
| any ideas that this study was about | | | |
| something other than what the researchers | Male | 8 (12.70%) | 55 (87.30%) |
| <u>described to you?</u> | Female | 17 (12.78%) | 115 (86.47%) |

HYPOTHESIS TEST

This study's dependent variable items reflect a focus on romance and gender roles and less on conservatism. The items were analyzed with MANOVA. Prior to the MANOVA, the dependent variables were inspected for correlations. All of the items correlated with at least two other items, so all were included in the model (Table 3.2).

Table 3.2

Correlations Between Dependent Variable Items

| | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|------|-------|------|-------|-----|-------|------|-------|-------|
| 1. I would recommend Naomi... | .16* | .12 | .17* | .12 | .05 | .36** | .13 | .30** | .09 |
| 2. Naomi's mother would recommend... | | .28** | .10 | -.15* | .03 | -.04 | .11 | .14* | .13 |
| 3. Naomi's mother would recommend... | | | .09 | .02 | .07 | .01 | .17* | .01 | -.01 |
| 4. It would be best for the Island if Naomi... | | | | .05 | .10 | .15* | .17* | .08 | .20** |
| 5. Pace Island is a romantic place† | | | | | .13 | .22** | .02 | .01 | -.07 |
| 6. Pace Island marriages are stable† | | | | | | .26* | .16* | .05 | .08 |
| 7. How happy would Naomi be as a wife and homemaker | | | | | | | .16* | .11 | -.11 |
| 8. How valued would Naomi be as a wife and homemaker? | | | | | | | | .02 | .26** |
| 9. How happy would Naomi be as a science writer?† | | | | | | | | | .14 |
| 10. How valued would Naomi be as a science writer?† | | | | | | | | | |

Note. † Reverse-scored * $p < .05$ ** $p < .01$

The MANOVA model showed a significant effect for the sex ratio manipulation, $F(10, 185) = 2.32, p = .013, \eta^2 = .11, \text{power} = .92$. The most powerful contribution was the item *Pace Island is romantic* (Table 3.3). The substantial effect size reinforces how sensitive romance is to the sex ratio manipulation.

The items *Pace Island marriages probably are stable, it would be best for the Island if all young women chose marriage and motherhood, and how happy will Naomi be as a science writer* all displayed means in the hypothesized direction, but power for these effects was low and they did not reach statistical significance (Table 3.3). The romance dependent variable item, which reflects the traditional gender roles associated with high sex ratios, supports the hypothesis that high sex ratios are linked to traditional gender role beliefs. These findings reiterate those of the pilot study—that in this population (college students), sex ratios do influence gender roles. The pattern of means for dependent variable questions on marital stability, motherhood and careers were congruent with these findings. The effect size of the romance item was robust ($d = .66$), so in this study, with these participants, romance was the most affected dimension of the hypothesized sex ratio-dependent gender role changes. This second study reiterated the findings from the pilot, namely that people's ideas about romance are influenced by sex ratios, at least in this particular population of college students. The statistically nonsignificant outcomes on the marriage and motherhood and science writer career dependent variable items were nevertheless interesting. Having bolstered support for the one part of sex ratio impacts led me to hypothesize that another part, sex ratio's impact on gender roles as they relate to careers, might also be supported if a specific manipulation focused on it. The script for this study's manipulation intermixed statements about romance with career options, with a notable focus on Naomi's relationship with her boyfriend. As a result, the romance manipulation overshadowed the career manipulation.

Table 3.3

Hypothesis Test of Dependent Variable Items

| Item | Experimental Group | | | | | | | | | |
|----------------------------|--------------------|--------------|--|-------------|--------------|----------|-----|----------------|-------|-----|
| | Too Many | | | | | Too Many | | | | |
| | Women | | | | | Men | | | | |
| | (n = 97) | | | | | (n = 99) | | | | |
| | | | | | | F | | | | |
| | M (SD) | 95% CI | | M (SD) | 95% CI | (1, 195) | p | η ² | power | d |
| I would recommend Naomi... | 2.50 (1.17) | [2.24,2.78] | | 2.45 (1.51) | [2.19, 2.72] | .07 | .79 | .00 | .06 | .04 |
| Naomi's mother would | | | | | | | | | | |
| recommend... | 4.73 (1.26) | [4.48, 4.99] | | 4.49 (1.29) | [4.24, 4.75] | 1.69 | .20 | .01 | .25 | .19 |
| Naomi's father would | | | | | | | | | | |
| recommend... | 3.77 (1.51) | [3.46, 4.03] | | 3.72 (1.65) | [3.40, 4.03] | .06 | .81 | .00 | .06 | .03 |

| Item | Experimental Group | | | | | | | | | |
|--------------------------|--------------------|--------------|---------------|--------------|----------------------|----------|----------|-------|----------|--|
| | Too Many | | | | | Too Many | | | | |
| | Women | | | | | Men | | | | |
| | (n = 97) | | | | | (n = 99) | | | | |
| | <i>M (SD)</i> | 95% CI | <i>M (SD)</i> | 95% CI | <i>F</i> (1, 195) | <i>p</i> | η^2 | power | <i>d</i> | |
| It would be best for the | | | | | | | | | | |
| island if Naomi... | 3.10 (1.26) | [2.86, 3.34] | 3.39 (1.14) | [3.16, 3.63] | 2.87 | .09 | .02 | .39 | .24 | |
| Pace Island is a | | | | | | | | | | |
| romantic place. | 3.45 (1.22) | [3.20, 3.71] | 4.12 (1.30) | [3.87, 4.38] | 13.73 | .0001 | .07 | .96 | .53 | |
| Pace Island marriages | | | | | | | | | | |
| are stable. | 4.70 (1.15) | [4.49, 4.89] | 4.95 (0.86) | [4.75, 5.15] | 3.19 | .08 | .02 | .43 | .25 | |
| How happy would Naomi | | | | | | | | | | |
| be as a wife | | | | | | | | | | |
| and homemaker? | 3.91 (1.04) | [3.70, 4.11] | 4.13 (1.02) | [3.93, 4.34] | 2.32 | .13 | .01 | .33 | .21 | |

Experimental Group

Item

| | Too Many Women (<i>n</i> = 97) | | Too Many Men (<i>n</i> = 99) | | <i>F</i> (1, 195) | <i>p</i> | η^2 | power | <i>d</i> |
|-------------------------|---------------------------------------|--------------|-------------------------------------|--------------|----------------------|----------|----------|-------|----------|
| | <i>M</i> (<i>SD</i>) | 95% CI | <i>M</i> (<i>SD</i>) | 95% CI | | | | | |
| How valued would Naomi | | | | | | | | | |
| be as a wife | | | | | | | | | |
| and homemaker? | 4.41 (1.09) | [4.19, 4.64] | 4.46 (1.18) | [4.24, 4.69] | .10 | .75 | .00 | .06 | .04 |
| How happy would Naomi | | | | | | | | | |
| be as a science writer? | 4.45 (0.88) | [4.29, 4.62] | 4.66 (0.76) | [4.94, 4.92] | 3.00 | .09 | .02 | .41 | .26 |
| How valued would Naomi | | | | | | | | | |
| be as a science writer? | 4.27 (1.17) | [4.03, 4.51] | 4.24 (1.21) | [4.01, 4.48] | .02 | .88 | .00 | .05 | .03 |

Conscientiousness, calculated by adding up individual items from the personality questionnaire, was added to the MANOVA as a covariate. The trait had no impact on the dependent variable measures, failing to support the hypothesis that conscientiousness is a moderator of the sex ratio manipulation. The personality test fared better as a distracting filler task, however. Several students remarked about the test, often alluding to it being the central focus of the study, in the open-response areas of the post-research questionnaire. Specifically, a few students remarked that they were suspicious that the experiment was focused on personality because I was at the time instructing the introductory personality class. Excluding those students' data made no difference in the analysis. During the time data were collected, participants showed no signs the test was unduly long or tiring—an improvement over the pilot study's materials.

At this point, the first two studies have provided evidence that the sex ratio manipulation was effective at affecting participants' perceptions of gender roles for other people. That is, the manipulation and dependent variable items focused on others, without asking the participants about any possible impact on themselves in an unbalanced sex ratio situation. I hypothesized that the sex ratio manipulation would be effective at influencing participants' perceptions of gender roles pertaining to themselves directly, as well as when the focus is on a third party (in the case of these studies, fictional characters).

CHAPTER 4

STUDY THREE

4.1 PARTICIPANTS

One hundred twenty-three participants, 26 male and 97 female, were recruited from the University of Nebraska-Lincoln undergraduate psychology student population via the Experimetrix online recruitment program. The mean age of students was 20.67 ($SD = 4.43$). Three students were significantly older than the typical undergraduate, at 39-50 years old. Excluding these three participants, all women, from the analyses did not change the outcome of those tests. The grade level distribution was fairly even across freshmen ($n = 32$), sophomores ($n = 32$), juniors ($n = 33$), and seniors ($n = 24$). Only one student had been enrolled more than four years, and only one participant declined to answer the question. Most of the students were White ($n = 96$) or Black ($n = 10$), while the rest were Asian ($n = 8$), Latino ($n = 4$), or Native American ($n = 2$). Three students did not report ethnicity. Students were offered one hour of experiment credit for their participation. Upon arrival, students were informed that the study concerned personality, culture, and career choices. They were told that following some standard demographic and personality questionnaires, they would listen to a description of a society and then answer some questions as if they were a member of that society. No mention was made of sex ratios, dating, or gender roles in the recruitment literature, informed consent, or initial instructions given to students.

4.2 PROCEDURE

The structure of this study was modeled on Study Two; participants completed identical demographic questionnaires and a personality questionnaire (Appendices B and G, respectively). Although I did not expect to find interesting interactions between conscientiousness and the sex ratio manipulation, the task was included as an effective and distracting task that reinforced the cover story.

After completion of the questionnaires, which took approximately ten minutes, participants listened to a recording that provided the main independent variable by describing a fictional island culture (Appendix V). The fictional location was the same as in Study Two, including the general description of the island's features and culture. Half of the participants heard a description of a culture with too few men, while the other half of the participants heard a description of a culture with too many men. Those distinctions were accomplished by altering the gender mentioned in the script. The script itself did not refer to specific sex ratio-related topics, such as relationship stability and gendered employment opportunities.

The recording provided information about various aspects of this island culture, with an emphasis on economy, employment, and careers. The script itself began with a broad description of the island's climate, location, and features. As the script progressed, additional details were added about the island's population, such as the rate of left-handedness. These details were presented to further the cover story, helping to ensure that when sex ratios were mentioned they did not stand out as the only detailed

information provided about the culture. As in the previous study, a male and a female member of the psychology department graduate student and faculty body performed the recording. The same documentary-style narration from the previous study was repeated here. A set of maps and charts accompanied the audio recording, which cued participants to look at each image in turn (Appendices H, K, L, T, & U).

After listening to the audio recording, participants answered a series of questions about career options and dating and marriage behaviors. The dependent variable items were designed to assess specific dimensions of sex ratio theory: traditional versus egalitarian relationship style, relationship stability, and availability of careers for women (e.g., *how likely is it that Pace Islanders bring potential partners romantic gifts like flowers and candy, how stable are marriages on Pace Island, who on Pace Island is most likely to be happy as a homemaker*). The questions were asked two ways. The first presentation of the question referred to Pace Islanders from a third-person perspective, such as *who on Pace Island is likely to pay for dates*. These questions were then rephrased to ask the participant about themselves if they were Pace Islanders, *how likely would it be for you to pay for dates*. Each statement was read aloud as part of the audio recording, followed by a brief pause to allow participants to mark their answers (see Appendix W). The answer options were of a Likert-type construction with a strong statement anchoring either pole. The anchors varied to match the questions. For questions such as *how likely are Pace Islanders to be politicians*, the anchors were *extremely unlikely* to *extremely likely*. For other questions, such as *who is most likely to pay for dates*, the anchors were *men* and *women*. The anchors were separated by six blank spaces. Instead of numbers to circle, participants were asked to mark a space on

the answer spectrum. These spaces were converted to numbers (one through six) when the data were coded for analysis. Several of these dependent variable items served as manipulation checks to ensure that the gender-disparity manipulation was salient in the participants (e.g., *it is easy for men to find a woman to ask out on dates*). Some of the questions were reverse-coded for data analysis, so that each question's low and high sex-ratio poles were in the same direction. One subset of questions probed available career choices in the fictional culture without mentioning gender in order to measure whether the manipulation altered how participants viewed employment opportunities, such as police officer, farmer, or teacher.

Last, participants completed a post-research questionnaire designed to measure their suspicion about the motives behind the research (Appendix X). They were then debriefed (Appendix Y) and dismissed.

4.3 RESULTS

MANIPULATION CHECK

Overall, participants exhibited a significant effect for manipulation as measured by dependent variable items designed to gauge the manipulation. The manipulation check items referring to the islanders specifically, like *it is easy for men to find a woman to ask out on dates*, were significant (see Table 4.1). These items were accompanied by a six-point Likert-type answer array, although the actual numbers were replaced by blank spaces. Higher means on these variables indicate a high sex-ratio orientation. For

example, on the item *it is easy for men to find a partner to ask out on dates*, all participants, both male and female, reported that it was more difficult for men to find partners in the high sex-ratio condition ($M = 4.57$, $SD = 1.64$) than in the low sex-ratio condition ($M = 3.09$, $SD = 1.84$). This item also had the largest effect size, at $d = 5.47$, so in this dimension of sex ratio effects, for the participants in this study, partner availability was the most influenced by the manipulation. The manipulation check items referring to participants imagining being residents of the island were also significant, except for men on a single item, *how easy would it be for you to find someone to marry*, $F(1, 121) = 2.09$ *ns*.

The four manipulation check items were entered into a MANOVA split by gender. By gender, the manipulation was more effective for women than for men supporting the initial hypotheses that women would be more strongly impacted by the sex-ratio disparity manipulation. The MANOVA model for women was significant $F(4, 82) = 1004.20$, $p = .0001$, partial $\eta^2 = .99$, power = 1.00. All four manipulation check items were also significant (Table 4.2). For men, the MANOVA was also significant, $F(4, 19) = 71.90$, $p = .0001$, partial $\eta^2 = .94$, power = 1.00. Three of the four items were significant (Table 4.3).

Table 4.1

Manipulation Check

| Item | Experimental Group | | | | | | |
|---------------------------------|--------------------|--------------|---------------|--------------|----------------------|----------|----------|
| | Too Many | | Too Many | | | | |
| | Women | | Men | | | | |
| | <i>M (SD)</i> | 95% CI | <i>M (SD)</i> | 95% CI | <i>F</i> (1, 109) | <i>p</i> | <i>d</i> |
| It is easy to find a partner | | | | | | | |
| to ask out on dates | 3.09 (1.84) | [2.64, 3.55] | 4.57 (1.64) | [4.14, 5.00] | 21.76 | .0001 | .85 |
| It is easy to find a person | | | | | | | |
| to marry | 1.38 (0.96) | [1.15, 1.62] | 5.72 (0.59) | [5.57, 5.88] | 884.38 | .0001 | 5.45 |
| How easy would it be for you to | | | | | | | |
| find someone to date? | 3.20 (1.46) | [2.84, 3.56] | 4.98 (1.26) | [4.65, 5.32] | 51.84 | .0001 | 1.31 |
| How easy would it be for you | | | | | | | |
| find someone to marry? | 3.14 (1.43) | [2.78, 3.45] | 4.78 (1.27) | [4.44, 5.11] | 44.42 | .0001 | 1.21 |

Table 4.2

Manipulation Check Gender = Female

| Item | Experimental Group | | | | | | |
|---------------------------------|--------------------|--------------|---------------|--------------|---------------------|----------|----------|
| | Too Many | | Too Many | | | | |
| | Women | | Men | | | | |
| | <i>M (SD)</i> | 95% CI | <i>M (SD)</i> | 95% CI | <i>F</i> (1, 95) | <i>p</i> | <i>d</i> |
| It is easy to find a partner | | | | | | | |
| to ask out on dates | 3.08 (1.86) | [2.56, 3.59] | 4.47 (1.75) | [3.94, 4.99] | 14.24 | .0001 | .77 |
| It is easy to find a person | | | | | | | |
| to marry | 1.31 (0.92) | [1.05, 1.56] | 5.80 (0.55) | [5.64, 5.96] | 821.82 | .0001 | 5.92 |
| How easy would it be for you to | | | | | | | |
| find someone to date? | 2.79 (1.13) | [2.48, 3.10] | 5.47 (0.73) | [5.25, 5.68] | 187.07 | .0001 | 2.82 |
| How easy would it be for you | | | | | | | |
| find someone to marry? | 2.87 (1.22) | [2.53, 3.21] | 5.18 (0.98) | [4.88, 5.47] | 103.29 | .0001 | 2.09 |

Table 4.3

Manipulation Check Gender = Male

| Item | Experimental Group | | | | | | |
|---------------------------------|--------------------|--------------|---------------|--------------|---------------------|----------|----------|
| | Too Many | | Too Many | | | | |
| | Women | | Men | | | | |
| | <i>M (SD)</i> | 95% CI | <i>M (SD)</i> | 95% CI | <i>F</i> (1, 24) | <i>p</i> | <i>d</i> |
| It is easy to find a partner | | | | | | | |
| to ask out on dates | 3.15 (1.86) | [2.03, 4.28] | 4.92 (1.19) | [4.21, 5.64] | 8.33 | .008 | 1.13 |
| It is easy to find a person | | | | | | | |
| to marry | 1.69 (1.11) | [1.02, 2.36] | 5.46 (0.66) | [5.06, 5.86] | 110.82 | .0001 | 4.13 |
| How easy would it be for you to | | | | | | | |
| find someone to date? | 4.85 (1.52) | [3.93, 5.76] | 3.31 (1.31) | [2.51, 4.10] | 7.62 | .011 | 1.09 |
| How easy would it be for you | | | | | | | |
| find someone to marry? | 4.23 (1.74) | [3.18, 5.28] | 3.38 (1.19) | [2.66, 4.11] | 2.09 | .161 | .57 |

SUSPICION CHECK

Participants' suspicion regarding the intent of the study was measured with a short questionnaire. None of the suspicion items were significant by condition or gender. One suspicion item was open-response regarding what information raised participants' suspicions regarding the true purpose of the experiment. Forty-four of the 123 participants entered one or more responses. Of the 81 separate statements, 24 related to gender, gender roles and/or sex ratio, 18 items specifically referenced general manipulation and 39 items related to content or methodology other than gender roles and sex ratios. Including those participants who made gender-specific suspicion comments made no difference in the analysis.

HYPOTHESIS TEST

A number of dependent variable items referred directly to life on Pace Island, where the participants were asked to decide what life on Pace Island was like for the islanders. One set in particular focused directly on sex ratio-related subjects, such as romance, marriage and gender roles, such as who is most likely to ask a potential partner out on a date. The specific anchor terms for each question varied. The terms *men* and *women* anchored questions asking about gender, such as who is most likely to initiate a relationship. Other items, such as how likely is it that Pace Islanders bring potential partners romantic gifts like flowers and candy, were anchored with *likely* and *unlikely*. In addition, items such as how stable are marriages on Pace Island were anchored with

specific terms such as *extremely stable* and *extremely unstable*. Some items were reverse-scored so that all items had the upper anchor (numerically a six) associated with high sex ratios. These dependent variable items were analyzed with a MANOVA. As with previous studies, the individual dependent variable items were first examined for correlations. All of these items correlated with at least two other items (Table 4.4).

Table 4.4

Correlations Between Dependent Variable Items

| Item | 2 | 3 | 4 | 5 | 6 |
|--|-------|-------|------|--------|--------|
| 1. Who is most likely to initiate a relationship?† | .44** | .14 | .19* | .02 | -.09 |
| 2. Who is most likely to pay for dates?† | | .37** | .20* | -.15 | .21* |
| 3. How likely is it that Pace Islanders bring potential partners romantic gifts like flowers and candy?† | | | .15 | -.11 | .10 |
| 4. How stable are marriages on Pace Island?† | | | | -.26** | .10 |
| 5. Who on Pace Island is most likely to be happy as a homemaker? | | | | | -.74** |
| 6. Who on Pace Island is most likely to be working outside the home?† | | | | | |

Note. † Reverse-scored * $p < .05$ ** $p < .01$

The analysis of this set of hypothesis testing dependent variables referring directly to Pace Islanders by condition found a significant main effect for sex ratio manipulation. The model was significant, $F(6, 116) = 6.82, p = .0001$, partial $\eta^2 = .26$, power = 1.00. The result was in the hypothesized direction; participants in the low sex ratio condition endorsed egalitarian statements while high sex ratio participants responded more traditionally. The sex ratio manipulation was effective even when the manipulation itself was not personalized by focusing on the choices facing a single (fictional) subject. Simply being told there was a sex ratio disparity was powerful enough to produce significant differences. Three of the six dependent variable items were significant, all reflecting higher means in the high sex ratio condition. All three focused on romance (who initiates relationships, who pays for dates, who gives flowers and candy) were significant. In the high sex ratio condition, men were consistently seen as initiators, and romantic gestures were more likely. The effect sizes for these three dependent variable items (ranging from $d = .40$ to $.97$) reinforce how powerful the manipulation was. It is clear from the means that the sex ratio manipulation affected participants' views of dating (Table 4.5) and marriage possibilities (Table 4.1). In the high sex ratio condition, women were far more optimistic about the likelihood of finding spouses, while in the low sex ratio condition men were more likely to estimate good chances of finding someone to marry. Again, romance was the most-influenced aspect, a finding congruent with Guttentag and Secord's hypotheses. The large effect on romance indicates that in this sample of college students, dating and partnering are of central importance—perhaps more than careers.

FIRST- PERSON DEPENDENT VARIABLES

Participants were first asked to answer the dependent variable questions for Pace Islanders. Next, they were asked to answer the same questions as if they were native Pace Islanders. An analysis of this set of dependent variable items necessitates splitting data by gender. At issue is that the questions ask the participants *living on Pace Island, how likely are you to pay for your dates*. If the sex ratio manipulation was effective, male and female participants would answer in opposite directions—regardless of the condition. In a high sex ratio manipulation, men would report high means (and women lower means) for the above item. In that manipulation, women are in undersupply so men should be more likely to report they would pay for their dates. Likewise, women should report they are not likely to pay for their dates. In the low sex ratio condition, men should report they are less likely to pay for dates, while women should report they are more likely to do so. Some of the dependent variable questions in this set do not share this gender-based pattern. Questions like *how stable would your relationships be*, apply the same to all participants.

The split data underwent the same analysis as the third-person dependent variable items. The six first-person dependent variable items were entered into a MANOVA. Prior to entry, the items were inspected for correlations. For female participants, all items correlated with at least one other item (Table 4.6). For male participants, all items but one correlated with at least one other item (Table 4.7). Excluding that one item did not make a difference in the analysis.

Table 4.5

Hypothesis Test for Pace Islander Items

| | <u>Experimental Group</u> | | | | | | | |
|---|---------------------------|--------------|------------------------|--------------|---------------------|----------|-------|----------|
| | Too Many Women | | Too Many Men | | | | | |
| Item | <i>M</i> (<i>SD</i>) | 95% CI | <i>M</i> (<i>SD</i>) | 95% CI | <i>F</i> (1, 24) | <i>p</i> | power | <i>d</i> |
| Men are likely to initiate relationships† | 2.69 (1.51) | [2.29, 3.10] | 4.19 (1.77) | [3.74, 4.62] | 25.60 | .0001 | .99 | 0.91 |
| Men are likely to pay for dates† | 4.00 (1.49) | [3.69, 4.31] | 5.22 (0.97) | [4.89, 5.56] | 28.34 | .0001 | 1.00 | 0.97 |
| Pace Islanders are likely to bring partners flowers and candy† | 4.11 (1.26) | [3.81, 4.40] | 4.59 (1.12) | [4.27, 4.90] | 7.02 | .03 | .59 | 0.40 |
| Marriages on Pace Island are stable† | 4.05 (1.07) | [3.82, 4.28] | 4.28 (0.77) | [4.03, 4.52] | 1.84 | .18 | .27 | 0.25 |
| Women on Pace Island are most likely to be happy as homemakers | 4.57 (1.09) | [4.31, 4.83] | 4.81 (0.98) | [4.54, 5.08] | 1.65 | .20 | .25 | 0.23 |
| Men on Pace Island are most likely to be happy working outside the home† | 4.49 (1.20) | [4.22, 4.77] | 4.67 (1.02) | [4.38, 4.96] | 0.80 | .37 | .14 | 0.16 |

Note. † Reverse-scored

Table 4.6

Correlations for First-Person Items, Gender = Female

| Item | 2 | 3 | 4 | 5 | 6 | <i>n</i> = 97 |
|---|-----|--------|------|--------|-------|---------------|
| 1. How likely would it be for you to initiate a relationship? | .14 | -.22* | .09 | -.14 | -.05 | |
| 2. How likely would it be for you to pay for your dates? | | -.47** | .22* | -.12 | .12 | |
| 3. How likely would it be for you to bring flowers and candy to your dates? | | | -.08 | .08 | -.21* | |
| 4. How stable would your relationships be? | | | | -.40** | -.08 | |
| 5. How happy would you be as a homemaker? | | | | | -.26* | |
| 6. How happy would you be working outside the home? | | | | | | |

Note. * $p < .05$ ** $p < .01$

Two MANOVAs were performed (one for males and one for females) using the hypothesis testing dependent variables referring directly to participants as though they were Pace Islanders by condition and found a significant main effect for sex ratio manipulation. For women, the model was significant, $F(6, 90) = 5.34$, $p = .0001$, partial $\eta^2 = .27$, power = 1.00. Once again, beliefs about romance were most susceptible to the sex ratio manipulation. An inspection of the bivariate analyses shows that the means were in the

hypothesized direction (Table 4.8). Women in the high sex ratio condition had lower mean scores on the item, *how stable would your relationships be*, which was anchored with 1 = stable and 6 = unstable, indicating that they viewed their potential relationships as stable.

Table 4.7

Correlations for First-Person Items, Gender = Male

| Item | 2 | 3 | 4 | 5 | 6 | <i>n</i> = 26 |
|---|------|-------|--------|------|-------|---------------|
| 1. How likely would it be for you to initiate a relationship? | -.14 | .00 | -.72** | -.11 | .02 | |
| 2. How likely would it be for you to pay for your dates? | | -.45* | -.207 | -.18 | .30 | |
| 3. How likely would it be for you to bring flowers and candy to your dates? | | | .31 | .06 | -.43* | |
| 4. How stable would your relationships be? | | | | .13 | -.23 | |
| 5. How happy would you be as a homemaker? | | | | | -.23 | |
| 6. How happy would you be working outside the home? | | | | | | |

Note. * $p < .05$ ** $p < .01$

For men, the model was not significant, $F(6, 19) = 1.51, p = .23$, partial $\eta^2 = .32$, power = .45. Two items were significant for condition, *how likely would it be for you to initiate a relationship* and *how likely would it be for you to pay for your dates*, (Table 4.9).

Males had a higher mean response in the high sex ratio condition, indicating that they thought they would pay for dates when there was a shortage of women—a pattern that matches the female sample's responses. The analysis of these dependent variables for men was hampered by a low sample size. While the effect size for the model was lower for males than for females, the lack of power undercut the main effect.

CHAPTER 5

DISCUSSION

The Pilot Study made it clear that sex ratio manipulations could shift the perception of gender roles. Even with a brief and essentially passive (written) manipulation, responses in the high sex ratio condition were more traditional while in the low sex ratio condition they were egalitarian. The responses to a single dependent variable item, *hanging out with a mixed group of friends is preferable to dating*, confirm the central hypotheses of both Guttentag and Secord (1983) and Glenn and Marquardt (2001). That is, when there are too many women the stereotypical rituals of dating and mate selection are abandoned in favor of a lax hook-up model. Changing sex ratios does, in fact, change how people view dating. That the form dating takes benefits men regardless of the sex ratio is attributable to disparities in structural power. When there are too many women, romance becomes less romantic because it does not serve men to expend the additional effort to woo potential mates.

Table 4.8

Hypothesis Test for First-Person Items, Gender = Female

| Item | Experimental Group | | | | <i>F</i> (1, 96) | <i>p</i> | power | <i>d</i> |
|--|--------------------|--------------|-----------------|--------------|---------------------|----------|-------|----------|
| | Too Many Women | 95% CI | Too Many Men | 95% CI | | | | |
| How likely would it be for you to initiate a relationship? † | 2.65 (1.49) | [2.20, 3.11] | 4.20 (1.83) | [3.71, 4.70] | 20.99 | .0001 | 1.00 | 0.93 |
| How likely would it be for you to pay for your dates? † | 3.98 (1.45) | [3.63, 4.33] | 5.24 (1.03) | [4.87, 8.62] | 23.87 | .0001 | 1.00 | 1.00 |
| How likely would it be for you to bring flowers and candy to your dates? † | 4.08 (1.28) | [3.74, 4.42] | 4.62 (1.19) | [4.26, 4.99] | 4.66 | .03 | .57 | 0.44 |
| How stable would your relationships be? † | 4.12 (1.10) | [3.85, 4.38] | 4.29 (0.76) | [4.01, 4.57] | 0.80 | .37 | .14 | 0.18 |
| How happy would you be as a homemaker? | 4.67 (0.99) | [4.40, 4.95] | 4.82 (1.03) | [4.53, 5.12] | 0.53 | .47 | .11 | 0.15 |
| How happy would you be working outside the home? † | 2.44 (1.14) | [2.13, 2.75] | 2.36 (1.09) | [2.03, 2.69] | 0.15 | .70 | .07 | 0.72 |

Note. † Reverse-scored

Table 4.9

Hypothesis Test for First-Person Items, Gender = Male

| Item | Experimental Group | | | | | | | |
|--|------------------------|--------------|------------------------|--------------|---------------------|----------|-------|----------|
| | Too Many Women | | Too Many Men | | | | | |
| | <i>M</i> (<i>SD</i>) | 95% CI | <i>M</i> (<i>SD</i>) | 95% CI | <i>F</i> (1, 25) | <i>p</i> | power | <i>d</i> |
| How likely would it be for you to initiate a relationship? † | 2.85 (1.63) | [1.92, 3.78] | 4.15 (1.63) | [3.22, 5.08] | 4.21 | 0.5 | .15 | .50 |
| How likely would it be for you to pay for your dates? † | 4.08 (1.71) | [3.31, 4.84] | 5.15 (0.80) | [4.39, 5.92] | 4.25 | 0.5 | .15 | .50 |
| How likely would it be for you to bring flowers and candy to your dates? † | 4.23 (1.24) | [3.62, 4.84] | 4.46 (0.88) | [3.85, 5.08] | 0.302 | .59 | .01 | .08 |
| How stable would your relationships be? † | 3.77 (0.93) | [3.27, 4.27] | 4.23 (0.83) | [3.73, 4.74] | 1.79 | .19 | 0.7 | .08 |
| How happy would you be as a homemaker? | 4.15 (1.41) | [3.49, 4.82] | 4.77 (0.83) | [4.11, 5.43] | 1.85 | .19 | .07 | .26 |
| How happy would you be working outside the home? † | 2.77 (1.42) | [2.12, 3.52] | 2.23 (0.73) | [1.59, 2.88] | 1.48 | .24 | 0.6 | .22 |

Note. † Reverse-scored

The weaknesses of the Pilot Study were clear. The manipulation worked, but it was not powerful. Reading is usually a passive activity, particularly for disinterested students. A manipulation that was no more than a couple of short paragraphs of non-challenging text was effective—barely. It was clear that a more powerful manipulation was necessary to really investigate the particular ways sex ratios impact gender role and dating perceptions. The shift from a short, written manipulation to a longer, audio recording provided additional strength to the manipulation. The audio was engaging, even fun (at least according to one participant), and kept participants' attention. Without their attention, I cannot hope to effect a change in their perceptions. They will not notice a change in sex ratios if they are not paying attention.

Even after changing the form of the manipulation for Studies Two and Three, romance remained the most susceptible to changes in sex ratio. Work or career-based items were affected, but the impact was muted compared to the romance-domain items. In the population studied, undergraduate students, romance was influenced most. One explanation is that this particular population is more attentive to dating and romance, something they may very well be involved in at the time of the study, and less attentive to career trajectories and options. For the typical university undergraduate student, careers may still be an abstract concept—one they may not pay much attention to for several years. Dating, however, is at the forefront of many of these students' minds. That romance was the most influenced area is not surprising.

The manipulations for the latter two studies contained information explicitly and obviously related to careers along with the romance and dating segments. Without attempting to undertake the study using a manipulation focused solely on careers and

work opportunities, it is difficult to say if the lack of response to the career items was due to the participants' interest in the topic or if it was, in fact, inattention due to the presence of romance and dating information. A future study looking only at careers might address the question.

Even with a single focus (careers), the proposed manipulation may not be as strong as those on romance. For college students, romance, and dating may be important, but it may also be straightforward—find someone, discern interest, evaluate possibilities. Thinking about career options is abstract for many people, including college students, who are less likely to spend time sifting through specific careers looking for the most advantageous one. Thus the broad and nebulous nature of work life and careers may necessitate a different kind of manipulation altogether.

Studying sex ratios by manipulating a person's imagined environment is not an easy task. The majority of published work on the topic of sex ratios has been demographic. That material provides a lot of evidence for a link between population sex ratios and variations in dating and marriage. It does not, however, provide stronger evidence that sex ratios themselves are a direct influence on gender role perceptions. The results of these three studies give evidence for that influence, providing substantial support for Guttentag and Secord's hypothesis.

High and low sex ratios bear the potential for substantial impacts throughout the socioeconomic spectrum, both locally and abroad. In the specific population studied, low sex ratios change the way traditional college students perceive gender roles, which in turn impacts how they view interactions between the genders up to and including long-term relationships and marriage. As the majority of undergraduate environments in the United

States have very low sex ratios, around 75, and have exhibited this differential for several decades, there should be a consistent expression of gender roles that reflects the low sex ratio throughout the population. That is, the informal, less restrictive dating patterns and unstable relationships that are a hallmark of low sex ratio situations should persist on campuses nationwide. The effect of low sex ratios on the college campus has now impacted every generation of college students following the baby boom generation. Among the people of those generations that attended college, we should see these distinct patterns of relationship development and gender role expression. Indeed, the less-restrictive dating patterns and unstable marital relations are pervasive. Yet the perception that dating and marriage should be carried out in traditional (high sex ratio) methods persists in the face of more than three decades of change in peoples' actual experience. This disparity may be at the heart of the uneasiness described in Glenn and Marquardt's study of college-age women and romantic relationships (2001). Young adults are conditioned to expect behaviors that are produced by an environment they do not inhabit. Indeed, popular media continues to describe modern dating and marriage in older terms, ones devised when sex ratios were higher and gender roles more restrictive (Eaton & Rose, 2001). Lamentations on the demise of marriage and high divorce rates focus on individual failure, or on the rise of women in the workplace. In the latter case, divorce may not be an effect of women working, but rather a parallel symptom of low sex ratios among the collegiate and post-collegiate population. Women working do not cause divorce; divorce and women working are two outcomes of low sex ratios (Trent & South, 1989; Chiappori, Fortin, & Lacroix, 2002). Sex ratios are just one of the factors influencing divorce rate; even in a region with a low sex ratio the state of the economy

will partially determine the rate of divorce.

Long-term low sex ratios at the collegiate level may also impact women (and men) at the marriage bottleneck that appears as members of a given population age. The number of men in the population of the college-educated will be disproportionately less than the overall number of men. This shortage will have a lingering impact on marriage patterns, particularly given that the average age of marriage has increased (Guttentag & Secord, 1983).

Outside of the United States, imbalanced sex ratios appear in locations such as India and China, where long-held cultural preferences for male children interact with economic and political pressures. In countries like India, sex ratios influence roles in society. India's national sex ratio is 109 in childhood and 106 through the early and middle adulthood years of 15-64. In some provinces, the sex ratio reaches 160. Only in late adulthood does the sex ratio drop below 100 (down to 90) (Census of India, 2001). Likewise, China also has elevated sex ratios: 113 in childhood, 106 in early and middle adulthood, and 91 in late adulthood (National Bureau of Statistics of China, 2011). By comparison, in the United States the sex ratio at birth is about 105, dropping to 100 in the 15-65 age range, and then down to 75 in late adulthood (United States Census, 2010). In developing areas such as India, women's roles are often limited to wife and mother, with little if any room for education and paid work (Chen, 2004). This effect is deleterious to the region's economic and social development, as the health and education of girls and women is key to economic advancement (Revenga & Shetty, 2012). These women are then stuck in unpaid, uneducated situations that allow them to be further devalued as uneducable and expensive—they cannot maintain paid work and are thus a burden to

their families. This cycle serves to both maintain a high sex ratio and suppress economic development (Guttentag & Secord, 1983).

China, long infamous for its one-child policy, has begun easing this restriction in the face of multiple challenges, one of which is a high sex ratio. Both China and India have become involved in UN efforts to increase gender equality (United Nations Development Programme (UNDP, 2010). Still, women are often consigned to less prestigious and worse paid jobs and may face pressure to receive sex-selective abortions to ensure male children (Hudson & Den Boer, 2004; Guttentag & Secord, 1983).

The economic and social impact of unbalanced sex ratios, particularly of high sex ratios, has the potential to appear in any population. Guttentag and Secord hypothesized that the impact of imbalanced sex ratios, particularly high sex ratios, would be most striking in the developing world. South and Trent (1988) found that the relationship between socioeconomic development and sex ratio impacts is not so simple. In their analysis, sex ratio effects were more pronounced in developed nations, but that in developing nations socioeconomic development had a more pronounced impact. That is, it was difficult to tease apart the various influences of sex ratio, population migration and socioeconomic development. However, more recent analyses by Hudson and Den Boer have pointed to specific impacts of elevated sex ratios in developing nations (2004). While the impact of sex ratio disparities may be more easily spotted in developed countries, the negative impact of those disparities, particularly of high sex ratios, is more serious in the developing world. In countries like the United States, sex ratio disparities may open or close employment avenues for women and influence marriage and divorce rates (Guttentag & Secord, 1983), in developing countries those elevated sex ratios may

cause political and civil unrest (Hudson & Den Boer, 2004). Social forces such as sex ratios that may influence gender roles in a restrictive direction for women do not serve to raise areas' economic and political situations.

Guttentag and Secord's work on sex ratios provided a starting point for a sociological, psychological, and economic understanding of the influence of sex ratios, an aspect of populations that is largely ignored or relegated to demographic conversations. Most of the research on sex ratios relies on census and other demographic data, a data source that while powerful in scope is correlational in nature. Experimental designs such as those used here have the potential to show causal force in the relationship between sex ratios and gender role perceptions. My research has found that sex ratios can be studied at a psychological level, drilling down from the broader level of analysis to provide new insight into this topic. By providing new avenues by which to investigate the effects of sex ratios, Guttentag and Secord's hypotheses may enjoy renewed interest as an influential psychological factor in human behavior.

PERSPECTIVE

When Guttentag and Secord published their manifesto on sex ratios, American society was in the midst of significant economic and social changes. They touched on the impact of changing work conditions for women, with more women entering the workforce--albeit at lower wages--than men. In the thirty years since their book's publication, dual incomes have become necessary to maintain a standard of living near that of previous generations. The nature of work in the US has changed. In the late

1970s, the service sector was a large part of the US economy, as was manufacturing. Today, information technology and services are an even larger part of the economy, while manufacturing is undergoing a shift overseas, resulting in fewer skilled labor jobs in the country. When women began going to college in large numbers, most of the jobs open to them were either unskilled labor positions, such as housekeeping, or office skill-based jobs such as secretary. While neither type of career paid well, secretaries did have a brighter long-term outlook. At the same time, men had more options available to them in terms of obtaining well-paid long-term employment. Men largely filled many skilled positions that required advanced education, such as engineering and medicine. However, the skilled-labor jobs requiring apprenticeship or on-the-job training but no higher academic education were plentiful. It was not difficult to find a skilled-labor job that paid well enough to support a family. Men, then, had less need to acquire a college education. Today, that pattern is weakening. Women's career opportunities have widened considerably, and most of the non-labor positions require some advanced education. Men's options regarding professional careers remain wide. Their options for a well-paying, stable career that does not require advanced education are narrowing. Many skilled-labor jobs have been removed from the domestic market in favor of overseas labor. Domestically, many skilled-labor positions are unstable, such as housing construction. Thus, while the college sex ratio may be stable, and low, for the moment, there is no guarantee it will remain that way indefinitely—and there may not be a good way to predict will happen as the US economy changes further. Thinking backward, social scientists theorizing at the turn of the 20th century would have had a difficult time prognosticating the drastic changes in education and work that have taken place over the

last century. It would be sheer hubris to attempt to do the same now, using only sex ratios and a fluctuating economy as a guide.

The research presented here elaborates the ability of sex ratios to influence behavior. It does not, however, shed much light on what specific outcomes will be produced by shifting sex ratios in specific populations. Given the results of this research, while we may be able to speculate that changing sex ratios will influence the gender role perceptions of Indian men and women, we cannot predict the actual outcome with any specificity. In fact, we could not even predict with specificity the outcome of the even this research using these manipulations in those populations. There are simply too many other factors to consider besides sex ratios, and sex ratios may be only a secondary factor in any gender role changes in Indian society as the nation's economy continues to evolve.

The US sex ratio has been low long enough that nearly every child and working adult has only experienced a low-sex ratio situation. Due to sex ratios, and many other factors, American society has changed dramatically in the decades since 1945, when the sex ratio swung from high to low. There is no guarantee that the country's sex ratio will stay low, but we do not really know what to predict if it does change. The way the American economy works is not the same as it was in 1945, and it is unlikely that the entirety of the country's social and labor structure would simply revert to those older patterns if the population were to suddenly have excess men in it. It is not that women would not want to keep working now that more men are available to do the jobs—women went to work during World War II, but went home afterwards. At issue is that we now live in a society that requires two incomes for the vast majority of families to maintain themselves. In order to speculate that the country would shift back to single-income

families would require more knowledge than we can access, given the complex nature of the changes that would have to occur. Would incomes for those mostly-male workers increase to offset the wages once earned by their female partners? Would the necessities of life become more affordable, so that families could survive on significantly less money? Questions such as these cannot be answered here, and may not have solid answers anywhere. We are left with a wait-and-see approach.

While the research presented here provides compelling evidence that the effects of sex ratio imbalances can cause changes in people's gender role perceptions, it does not directly address the influence of culture on sex ratios, or the interaction of culture and sex ratios. The population studied is highly idiosyncratic—undergraduate students, mostly psychology majors, at a midwestern university. With a research topic like sex ratios, culture cannot be completely discounted. The hypothetical influence of sex ratios, as formulated using exchange theory and structural power hypothesis, reflects little of the cultures that must exist within and between the people who are actually studied once research begins. In the most optimistic viewing of sex ratio influence, this pattern should appear in any culture, although the expression of that pattern would vary greatly. However, there are issues of culture and sex ratios that limit the assumptions we can actually make. Guttentag and Secord work from the premise that in most societies, structural power sits firmly in the hands of men. None of their in-depth historical investigations are of cultures where males either do not have structural power or share it equally with women. They do give brief mention to the Bakweri, a West African culture where women held structural power. Unfortunately, their analysis is brief, in part because Bakweri society as originally described no longer exists. European colonists

imported their culture, overwhelming the Bakweri's existing framework. The complication that arises from the introduction of outside influences frustrates the investigation into the nature of sex ratio influences in matrilineal and matriarchal cultures. Several Native American cultures were historically matrilineal or matriarchal, including the Hopi. While many aspects of their culture persist today, that culture has been indelibly marked by generations of influence from the outside. As a result, we are left with the historical analysis technique used by Guttentag and Secord but without a good way of testing sex ratio influences in a manner similar to that used in my research. We are left with speculation and a great many questions about what might be when women hold structural power, but with limited answers.

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APPENDIX A

Pilot Study Informed Consent

Consent to participate: Perceptions of Social Context

One hour (Two credits)

IRB#: 2002-04-268 EP

The purpose of this study is to explore behavior in certain social situations, examine cognitive learning abilities and research some social factors. You are invited to participate in this research because you are presently enrolled in a psychology course at the University of Nebraska-Lincoln, and you are at least 19 years old, or if under 19, then you have parental permission for research participation.

This study will be conducted online, on a computer in a computer lab in Burnett Hall.

The study session will take about one hour. You will complete a series of standard demographic questions, such as age, race, gender, employment status, income level and religious affiliation. You will also read a vignette and answer several questions regarding it.

There are no known risks or discomforts associated with this research. In the event of problems resulting from participation in this study, psychological treatment is available at the UNL Psychological Consultation Center, telephone (402) 472-2351.

You understand that this study is not designed to help you personally, but that the information gained from this project will contribute to our knowledge of how people behave in social situations. However, you will learn how research of this type is conducted.

Any information obtained during this study that could identify you will be kept strictly confidential. The data from this study will be stored in a locked cabinet in Burnett Hall

for five years after the study is completed. When completed, results from this research may be presented at scholarly conferences and/or published in journals in summary form -- no individuals will be identified in those presentations or reports.

You will receive two credits for participating in this research.

You may ask questions of the researcher about the research and have those questions answered before agreeing to participate, or during the research. You may call the researchers at anytime at the phone numbers listed at the bottom of this form. If you have any questions about your rights as a research participant that have not been answered by the investigators, you may contact the University of Nebraska Lincoln Institutional Review Board, telephone (402) 472-6965.

You are free to decide not to participate in this study or to withdraw at any time without affecting your relationship with the researchers, your instructor, or with UNL. Your decision will not result in any loss of benefits to which you are otherwise entitled.

You are voluntarily making a decision whether or not to participate in this research study. Typing your full name below and submitting this document certifies that you have decided to participate having read and understood the information presented. You may print a copy of this form to keep for your records.

Participant Signature

Date

Names and phone numbers of investigators:

Elizabeth A. Boger, Principal Investigator, 472-3492

Cynthia Willis-Esqueda, Secondary Investigator, 472-3740

APPENDIX B

Demographic Questions

1. Please indicate your age:_____
2. Sex:_____
3. Race/Ethnicity:_____
4. Marital Status:_____
5. Occupation:_____
6. Year in School:_____
7. Your average yearly income:_____
8. Parent's average yearly income:_____
9. Years of residence in Nebraska:_____
10. Are you a registered voter?_____
11. Are you a member of a political party?_____
12. If yes, which one?_____
13. Do you regularly attend a religious service?_____
14. If yes, which denomination?_____
15. Do you have any children?_____
16. If yes, what are their ages?_____
17. Is English your first and primary language?_____

APPENDIX C

Pilot Study Vignettes

High Sex Ratio Condition

You are a student enrolled Laurel College, a small, private college situated in rural Vermont. As a student at Laurel College, you enroll in a variety of liberal arts courses and enjoy the restaurants, movie theatres, and shopping mall in neighboring White Pine. The community caters to the college's students and employees, so you have no shortage of activities.

Since its opening more than a hundred years ago, the college has been a men-only institution, a feature of the school which has changed just this year. Due to economic concerns and the changing climate of higher education, Laurel College has decided to become a coeducational institution. In preparation for these changes, the college renovated its existing facilities and built new dormitories for the small contingent of new female students.

Having settled into life on campus, you are now ready to enter the dating scene and perhaps initiate a relationship with one of your fellow students.

Low Sex Ratio Condition

You are a student enrolled in Laurel College, a small, private college situated in rural Vermont. As a student at Laurel College, you enroll in a variety of liberal arts courses and enjoy the restaurants, movie theatres, and shopping mall in neighboring

White Pine. The community caters to the college's students and employees, so you have no shortage of activities.

Since its opening more than a hundred years ago, the college has been a women-only institution, a feature of the school which has changed just this year. Due to economic concerns and the changing climate of higher education, Laurel College has decided to become a coeducational institution. In preparation for these changes, the college renovated its existing facilities and built new dormitories for the small contingent of new male students.

Having settled into life on campus, you are now ready to enter the dating scene and perhaps initiate a relationship with one of your fellow students.

Control Condition

You are a student enrolled Laurel College, a small, private college situated in rural Vermont. As a student at Laurel College, you enroll in a variety of liberal arts courses and enjoy the restaurants, movie theatres, and shopping mall in neighboring White Pine. The community caters to the college's students and employees, so you have no shortage of activities.

Having settled into life on campus, you are now ready to enter the dating scene and perhaps initiate a relationship with one of your fellow students.

APPENDIX D

Pilot Study Dependent Variable Items

Please respond to the following statements as though you are a student at Laurel College. There are no right or wrong answers. CIRCLE THE ANSWER THAT BEST REFLECTS HOW YOU WOULD FEEL MOST OF THE TIME IF YOU WERE A STUDENT AT LAUREL COLLEGE. If you totally disagree with a statement, circle a one. If you totally agree with a statement, circle a seven. Check to make sure you answer each question. If you have any questions, please ask the experimenter.

Remember, answer the questions as though you were a student at Laurel College.

| | | | | | | |
|----------|------------|----------------|----------|-------------------|------------|----------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| strongly | moderately | agree slightly | neither | disagree slightly | moderately | strongly |
| agree | agree | more than | agree | more than | disagree | disagree |
| | | disagree | nor | agree | | |
| | | | disagree | | | |

1. A very romantic way to show affection for a women is to give flowers or candy.
2. In romantic relationships, men should do the initiating and pay for the dates.
3. Men should be the initiators of romantic relationships.
4. Men should act like gentlemen during dates.
5. Hanging out with a mixed group of friends is preferable to dating.
6. Marriage is the most natural goal for a young woman.
7. It is natural for a mother to play a more direct role in the care and education of her children.

8. I think it's ok for unmarried men and women to cohabitate.

APPENDIX E

Pilot Study Debriefing

Record your participant code here, for your future reference:_____

The primary purpose of this study is to investigate how the perception of gender roles changes when the sex ratio of a group changes. More specifically, we are studying how the sex roles of women change when there are more men than women, or more women than men, in a group.

Thank you again for participating in our research. If you have any further questions about the research or your scores, feel free to contact one of the investigators listed below.

Elizabeth A. Boger, Principal Investigator, 472-3492

Richard A. Dienstbier, Secondary Investigator, 472-3723

APPENDIX F

Study Two Informed Consent

Consent to Participate (2 Credits)

Personality, Culture & Careers

The purpose of this study is to explore the relationships between personality, culture and how you look at career choices. You are invited to participate in this research because you are presently enrolled in a psychology course at the University of Nebraska-Lincoln and you are at least 19 years old, or if under 19, then you have parental permission for research participation.

This study will be conducted in the Department of Psychology in Burnett Hall at UNL. This study will take about one hour. During that time you will complete some standard demographic and personality questionnaires, listen to a description of a society and answer some cultural and career questions about the society as well as ‘as if’ you were a member of that society.

There are no known risks or discomforts associated with this research. However, in the event of problems resulting from participation in this study, psychological treatment is available at the UNL Psychological Consulting Center, telephone (402) 472-2351.

You understand that this study is not designed to help you personally, but that the information gained from this project will contribute to our knowledge of personality and decisions. However, you will learn how research of this type is conducted.

Instead of participating in this study, you may participate in other studies or activities that are approved for extra credit by your instructor.

Any information obtained during this study that could identify you will be kept strictly confidential. Informed consent forms and Experimetrix participant lists will not be kept with your individual data. All data from this study will be stored in a secure room in Burnett Hall for three years after the study is completed. When completed, results from this research may be presented at scholarly conferences and/or published journals in summary form, but no individuals will be identified in those presentations or reports.

You will receive credits for participating for one hour in this research, provided you complete all research materials. If you fail to complete the materials we will not be able to use your data, and therefore no experimental credit will be given.

You may ask questions of the researcher about the research and have those questions answered before agreeing to participate, or during the research. If you have research questions you may call the researchers at any time at the phone numbers listed at the bottom of this form. If you have any questions about your rights as a research participant that have not been answered by the researchers or to report any concerns about this study, you may contact the University of Nebraska-Lincoln Institutional Review Board, telephone (402) 472-6965.

You are free to decide not to participate in this study or to withdraw at any time without affecting your relationship with the researchers, your instructor, or with UNL. Your decision will not result in any loss of benefits to which you are otherwise entitled. You are voluntarily making a decision whether or not to participate in this research study.

Your signature certifies that you have decided to participate having read and understood the information presented. You will be given a copy of this form to keep.

Participant Signature Date

Elizabeth A. Boger, Principal Investigator, 472-3492

Richard A. Dienstbier, Secondary Investigator, 472-3723

APPENDIX G

Five-Factor Personality Inventory

On the following pages, there are phrases describing people's behaviors. Please use the rating scale below to describe how accurately each statement describes you. Describe yourself as you generally are now, not as you wish to be in the future. Describe yourself as you honestly see yourself, in relation to other people you know of the same sex as you are, and roughly your same age. So that you can describe yourself in an honest manner, your responses will be kept in absolute confidence. Please read each statement carefully, and mark the number that corresponds to the number on the scale. Response options:

| | | | | |
|------------|------------|--------------------|------------|----------|
| 1 | 2 | 3 | 4 | 5 |
| Very | Moderately | Neither Inaccurate | Moderately | Very |
| Inaccurate | Inaccurate | nor Accurate | Accurate | Accurate |

1. Am the life of the party.
2. Feel little concern for others.
3. Am always prepared.
4. Get stressed out easily.
5. Have a rich vocabulary.
6. Don't talk a lot.
7. Am interested in people.
8. Leave my belongings around.

9. Am relaxed most of the time.
10. Have difficulty understanding abstract ideas.
11. Feel comfortable around people.
12. Insult people.
13. Pay attention to details.
14. Worry about things.
15. Have a vivid imagination.
16. Keep in the background.
17. Sympathize with others' feelings
18. Make a mess of things.
19. Seldom feel blue.
20. Am not interested in abstract ideas.
21. Start conversations.
22. Am not interested in other people's problems.
23. Get chores done right away.
24. Am easily disturbed.
25. Have excellent ideas.
26. Have little to say.
27. Have a soft heart.
28. Often forget to put things back in their proper place.
29. Get upset easily.
30. Do not have a good imagination.
31. Talk to a lot of different people at parties.

- 32. Am not really interested in others.
- 33. Like order.
- 34. Change my mood a lot.
- 35. Am quick to understand things.
- 36. Don't like to draw attention to myself.
- 37. Take time out for others.
- 38. Shirk my duties.
- 39. Have frequent mood swings.
- 40. Use difficult words.
- 41. Don't mind being the center of attention.
- 42. Feel others' emotions.
- 43. Follow a schedule.
- 44. Get irritated easily.
- 45. Spend time reflecting on things.
- 46. Am quiet around strangers.
- 47. Make people feel at ease.
- 48. Am exacting in my work.
- 49. Often feel blue.
- 50. Am full of ideas.

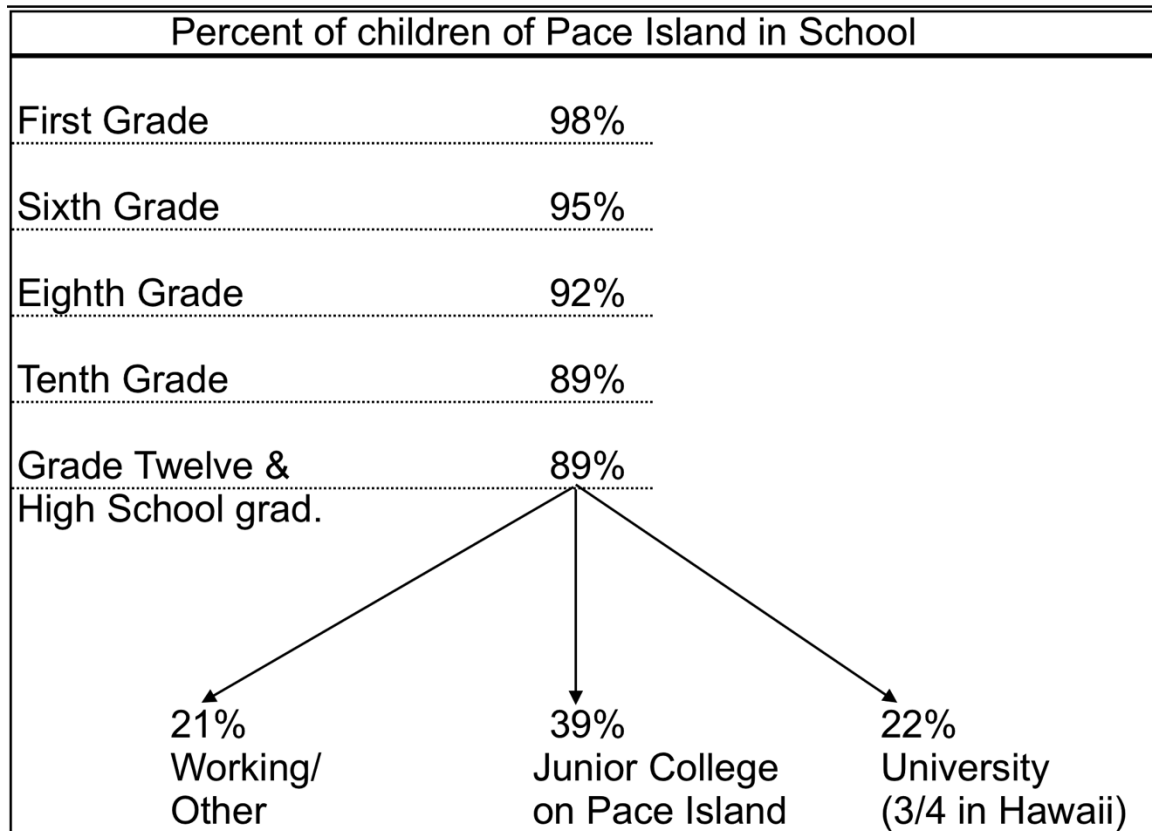
APPENDIX H

Map Image



APPENDIX I

Study Two Percent of Children in School Figure

Figure 2

APPENDIX J

Study Two Occupation Figure

Figure 3

| Pace Island: Percentages in various occupations across four decades | | | | | |
|--|------|------|------|------|------|
| | 1960 | 1970 | 1980 | 1990 | 2000 |
| Agriculture | 33 | 31 | 25 | 20 | 13 |
| Manufacturing | 21 | 18 | 15 | 11 | 12 |
| Retail & Sales | 14 | 15 | 19 | 20 | 18 |
| Education | 11 | 13 | 12 | 15 | 15 |
| Fishing | 10 | 9 | 8 | 8 | 5 |
| Professional | 4 | 6 | 9 | 13 | 18 |
| Self Employed/Other | 7 | 8 | 12 | 13 | 19 |
| Total | 100 | 100 | 100 | 100 | 100 |

APPENDIX K

Study Two Percent of Males and Females (High Sex Ratio Condition)

Figure 4

| Pace Island: Percent and Numbers of Males and Females of all ages across 8 decades | | | |
|--|----------------------|----------------|--------------------------------|
| Year | Numbers in Thousands | | Percent of Males in Population |
| | <i>Males</i> | <i>Females</i> | |
| 1920 | 48 | 30 | 61.6% |
| 1930 | 49 | 33 | 59.7% |
| 1940 | 54 | 34 | 61.4% |
| 1950 | 57 | 39 | 59.4% |
| 1960 | 65 | 45 | 59.1% |
| 1970 | 73 | 52 | 58.9% |
| 1980 | 82 | 55 | 59.9% |
| 1990 | 89 | 61 | 59.3% |
| 2000 | 98 | 67 | 59.4% |

APPENDIX L

Study Two Percent of Males and Females (Low Sex Ratio Condition)

Figure 4

| Pace Island: Percent and Numbers of Males and Females of all ages across 8 decades | | | |
|--|----------------------|--------------|----------------------------------|
| Year | Numbers in Thousands | | Percent of Females in Population |
| | <i>Females</i> | <i>Males</i> | |
| 1920 | 48 | 30 | 61.6% |
| 1930 | 49 | 33 | 59.7% |
| 1940 | 54 | 34 | 61.4% |
| 1950 | 57 | 39 | 59.4% |
| 1960 | 65 | 45 | 59.1% |
| 1970 | 73 | 52 | 58.9% |
| 1980 | 82 | 55 | 59.9% |
| 1990 | 89 | 61 | 59.3% |
| 200 | 98 | 67 | 59.4% |

APPENDIX M

Percentages of Males and Females By Age Group (High Sex Ratio Condition)

Figure 5

| Pace Island: Current (year 2000) percentages of males and females at various age groups | | |
|--|--------------|----------------|
| Age | Percent Male | Percent Female |
| Birth to age 10 | 58.1% | 41.9% |
| 10 to 30 years old | 59.1% | 40.9% |
| 30 to 50 years old | 60.2% | 39.8% |
| 50 to 70 years old | 61.6% | 38.4% |
| Over 70 years old | 64.0% | 36.0% |
| All ages average | 59.4% | 40.6% |

APPENDIX N

Percentages of Males and Females By Age Group (Low Sex Ratio Condition)

Figure 5

| Pace Island: Current (year 2000) percentages of males and females at various age groups | | |
|--|----------------|--------------|
| Age | Percent Female | Percent Male |
| Birth to age 10 | 58.1% | 41.9% |
| 10 to 30 years old | 59.1% | 40.9% |
| 30 to 50 years old | 60.2% | 39.8% |
| 50 to 70 years old | 61.6% | 38.4% |
| Over 70 years old | 64.0% | 36.0% |
| All ages average | 59.4% | 40.6% |

APPENDIX O

Study Two Script

VOICE 1 [A MAN]: We are going to tell you about a place where a girl named Naomi is growing up. Then we are going to ask you to act as a career counselor, and to give advice to Naomi about what she should do with her life. And after that, we are going to have you switch roles and to think about this community as if you were the governor, to decide which choices that Naomi could make would most benefit the community. As you listen to descriptions of Naomi and of the Island where she lives, you do not need to memorize any facts or figures. To simplify that, we have even made up some graphs to illustrate the facts and figures that you might want to have on hand when it is time to advise Naomi. That sheet of graphs should be on your desk now.

VOICE 2 [A WOMAN]: Naomi lives on Pace Island. For now, just listen and try to visualize Pace Island. Like Hawaii, Pace Island was settled by Polynesian people at least a thousand years ago. Although the Polynesian culture flourished there for hundreds of years, like all such places Pace changed after European explorers arrived, and it changed again after settlers from many parts of the world brought their many different cultures. Today some citizens of Pace Island look Polynesian, some look Asian, some look European, and some look as if they could have come from Lincoln, Nebraska.

Pace Island is much larger than you might think when you imagine a quiet Pacific island. Although it is only 90 miles long and 35 miles wide, it has almost 2000 square miles of useful land, and a population of 165,000 people—about three-fourths as many

people as live in Lincoln. Pace is located approximately 1000 miles west of, and somewhat north of Hawaii. The relative isolation of Pace means that people who grow up on Pace generally stay there, and although Pace was settled by people from many parts of the world, Pace no longer attracts immigrants from outside. Perhaps that is because its climate is not as tropical as many other islands of the Pacific. Tourists seldom find their way to Pace Island.

VOICE 1: Figure 1 on the sheet of Figures on your desk shows the approximate location of Pace in the Pacific Ocean. (PAUSE IN TAPE FOR 5 SECONDS)

Currently Pace has a culture that reflects its developing economy. Some citizens still make their living in traditional ways, by fishing and raising crops. However, schools provide a basic education for all citizens, and there is a junior college system in place that allows high school graduates of Pace to either learn a job skill or take college-preparatory courses. If they choose to get a University degree, the young people of Pace usually go to Hawaii. However, where ever they go to school, most Pace islanders come back to Pace to live and work. Why come back? Family ties are really important to the people who grow up on Pace Island, and family ties and the pull of coming home are almost always sufficient to cause Pace Islanders to return home.

VOICE 2: Please look at Figure 2. This graph shows the % of kids of Pace that attend grades from first grade through college. TAPE PAUSES 5 seconds. Notice that the % of young people who graduate from high school is quite high, at 82%, and that almost half go on to 2 years of Junior College, but that the % who g on to college in

Hawaii Is 22%. Fortunately for Pace, almost all of those who go away to college in Hawaii eventually return to their home island. (PAUSE IN TAPE 5 SECONDS.)

VOICE 1: Besides the importance of family ties for Pace Islanders, another important reason why Pace citizens who travel abroad return to Pace Island is that there are ample employment opportunities in the growing economy of Pace for those who have graduated from high school, junior college, or the University. The usual array of doctors, lawyers, teachers, plumbers, bakers, salespeople and car dealers live and do business on Pace, but internet connections also allow people to work for companies and organizations throughout the world. Because people can commute electronically, it is possible to work from one's own home office in occupations ranging from writers to software developers. Being able to work for companies that are far away also allows Pace Islanders to live on their home island.

VOICE 2: Please look at Figure 3. This figure shows the % of people in the workforce who are involved in various occupations. PAUSE. This figure shows only the % of the workforce that are considered wage or income earners. NOT INCLUDED in the Figure are young people who are not employed, retired people, people who stay at home to raise kids and so forth. Notice that across the decades the % of people in the work force who are in direct agriculture, raising crops and animals, has dropped. That change reflects the developing economy on Pace Island and the associated increase in alternative occupations. [[Classifications in figure of agricultural, fishing, manufacturing, retail, professional (including teachers), miscellaneous self-employed, and other]]

LOW SEX RATIO CONDITION

VOICE 1: Another distinctive feature of Pace island is that fewer men than women live on Pace Island. In literally all age groups there are only 10 males for every 15 females. On a walk through the middle of any town on the Island, you notice the shortage of men. Even in church, the choirs have very few men. That shortage of men dates back many generations. Folk stories that have been passed across the generations mention shortages of boys and men. When 18th century explorers noticed that men were scarce compared to women, it was assumed then that many men may have died early as a result of fishing accidents or that certain diseases killed boys and men more than girls and women. But that does not seem to be the case, because birth records confirm that in a typical year, only 10 boys are born for every 15 girls. Thus the only reasonable modern explanation is that the cause of so few boy babies must be genetic. Even after peoples from other cultures and races have come to Pace Island and mixed their genes with those of the original population, the problem remains that can be seen one of two ways, either too few men or too many women.

VOICE 2: Please look at Figure 4. Notice that across the last 80 years, since accurate records have been available, that compared to women, men have been continuously in short supply on Pace Island. (PAUSE 5 SECONDS)

HIGH SEX RATIO CONDITION

VOICE 1: Another distinctive feature of Pace Island is that fewer women than men live on Pace Island. In literally all age groups there are only 10 females for every 15

males. On a walk through the middle of any town on the Island, you notice the shortage of women. Even in church, the choirs have very few women. That shortage of women dates back many generations. Folk stories that have been passed across the generations mention shortages of girls and women. When 18th century explorers noticed that women were scarce compared to men, it was assumed then that many women may have died in childbirth or that some tropical disease killed girls and women more than boys and men. But that does not seem to be the case, because birth records confirm that in a typical year, only 10 girls are born for every 15 boys. Thus the only reasonable modern explanation is that the cause of so few girl babies must be genetic. Even after peoples from other cultures and races have come to Pace Island and mixed their genes with those of the original population, the problem remains that can be seen one of two ways, either too few women or too many men.

Voice 2: Please look at Figure 4. Notice that across the last 80 years, since accurate records have been available, that compared to men, women have been continuously in short supply on Pace Island. (PAUSE 5 SECONDS)

ALL CONDITIONS

VOICE 1: Please turn your attention to Figure 5. Figure 5 presents the ratio of women to men right now, but looks at the sex ratio for different age groups. The gradual shift you see in this graph reflects the fact that on Pace Island, like in most areas of the world, men get killed at a slightly higher rate than women do, by accidents, and men do not typically live as long as women.

Now it is time to meet Naomi, one of the young women of Pace. Naomi was born into a family with three children. She had

LOW SEX RATIO: 2 sisters and no brothers

HIGH SEX RATIO: 2 brothers and no sisters

She is going to need some help deciding what to do with her life. Naomi's father owns a store and her mother has devoted herself to being a mother and a homemaker for her family. Both her mother and father have been happy with their respective roles, the father as a businessman and the mother as a mom and homemaker. And even though she is a teenager, Naomi loves and respects both her mother and her father. So, as you might expect, Naomi sees the potential for happiness for herself by devoting herself to becoming a wife and mother, but she thinks that she could also be happy by becoming a career woman. And to make matters complicated, both choices are apparently wide open for Naomi. This, dear listener, is where your advice will come in.

VOICE 2: With respect to the role of becoming a stay-at-home mom, Naomi has a boyfriend named Sam. So, Sam is one of those

LOW SEX RATIO: scarce young men that are around the same age as Naomi.

HIGH SEX RATIO: plentiful young men that are around the same age as Naomi.

They both love kids. They are at the early stage of their relationship, and seem ready to fall in love; maybe they are in love—they're not sure. They sometimes talk

about the possibility of getting married and of having a large family of their own children. Sam's father owns a car dealership, and it is clear that Sam will follow his father into successful business. Sam's dad has already painted 'and Son' on the sign at the dealership. So, Sam's choices in life seem quite settled because Sam is ready and eager to join his dad in business. And Sam is well-prepared, because at the age of 20 he is just finishing a couple of years at Pace Junior College taking business courses. Probably if Naomi decided to, she could marry Sam and settle down to a life of being a stay-at-home mom, raising kids and living her life much like the happy life of her own mother. If Naomi and Sam do progress through their relationship and get married, her marriage to Sam will take place within a year or two at most, because when people get married on Pace Island, they usually do it quite young at around the age Sam and Naomi are now, in other words, around 20 or 21 years old.

VOICE 1: But Naomi has another interest too. Sometimes she thinks about becoming a professional writer. In high school and in her junior college course she loved English literature, and showed skill as a writer in class writing projects. Back in high school she was one of the editors of her yearbook. Through her junior college courses, Naomi also discovered an interest in science. Thus today when Naomi thinks about being a writer, she thinks about being a science writer. She imagines herself writing about how the islands formed, and about the ecological balances of the creatures that live on Pace Island. Naomi knows that to educate herself sufficiently to pursue this career as a science writer she will need to leave Pace Island for at least an undergraduate degree at the University of Hawaii. She expects that if she does this she will double-major in both

science and in English. Fortunately the policy on Pace Island is that college tuition is paid for by the Island government. Because almost everyone who goes off to college returns to Pace Island, that turns out to be a good investment in the Island's future.

VOICE 1: As the person soon to be in the role of her career counselor, dear listener, your problem becomes a bit complicated, because Naomi really cannot choose both these future roles in life. She is not burning to be a mother, though she thinks she would be quite happy in that role, and similarly she is not burning to be a science writer, although she thinks that too would make her happy. With your help she must make this difficult choice. Realistically, she knows she cannot choose both. Because if Naomi goes 1000 miles away to Hawaii to college, she knows Sam will not come too. And Naomi is realistic about Sam. She can imagine marrying him, but she knows that if she goes to college on Hawaii that Sam will not wait for her. Unreasonable or not, Sam feels that if Naomi goes off without him for 4 or 5 years that she does not care as much about their relationship as he does. Naomi doesn't blame Sam for that, because in fact he may be right; he probably wouldn't go away from Naomi for years.

LOW SEX RATIO: Being realistic about it, Naomi figures that because Sam is such an attractive young man, and because young men in general are in short supply on Pace Island, he certainly will have no problem finding someone that he will marry.

HIGH SEX RATIO: Being realistic about it, Naomi figures that because Sam is such an attractive young man, he will certainly have no problem finding someone that he will marry, even though young women are in such short supply on Pace Island.

VOICE 2: If Naomi does choose to go off to the University of Hawaii and become a professional science writer, even though Sam will surely not be waiting for her, Naomi knows that like almost everyone else who leaves, she will come home to Pace Island after college, but it is hard for her to visualize her life that far into the future.

VOICE 1: Naomi has a difficult choice. She often talks about this dilemma of her future with her friends.

LOW SEX RATIO: Because there are so few young men her age, as you would expect most of her friends are young women, and naturally it is her women friends that she consults about these choices.

HIGH SEX RATIO: Because there are so few young women her age, as you would expect, many of her friends are young men, but naturally it is her women friends that she consults about these choices.

VOICE 2: The researcher is now passing out to you an answer sheet that you will use to answer the questions that we will now ask you. Please do not answer any question until we are done reading the question to you.

VOICE 1: Here is Question number 1: Please just listen—do not write anything yet. Put yourself in the position of a career counselor. For the moment, you can forget all about what the economy on Pace Island needs or does not need, and you can forget about what you personally would choose if you were in Naomi's place. Your only

interest is to be of maximum benefit to Naomi. We want you to help Naomi choose the direction for her life that will bring her the greatest happiness.

Although Naomi must decide on one of two paths (truly she can't do both), we will allow you to hedge a bit by making either a strong or a mild recommendation. Please answer question 1 now. (PAUSE IN TAPE FOR 10 SECONDS)

VOICE 2: Next we need you to tell us what you think her parents would advise her. Please answer questions 2 and 3 NOW, in question 2 tell what you believe her mother would advise her and in question 3 what her father would advise her to do.

VOICE 1: Next, we want you to think like the governor of Pace Island. Remember, Pace Island is a place that allows a great variety of occupations, that mixes traditional culture with an emerging economy, that strongly values family ties, that people always seem to come home to, and that always seems to have too few

MEN, or

WOMEN

You are NOT advising Naomi. But instead, as you think about Naomi and other young women like her, what do you think would be best for this Island community? Thinking as the governor, now answer Question 4 concerning what would be best for this community if girls like Naomi:

VOICE 2: You know that Naomi and Sam are probably in love, but we haven't told you anything about relationships between young men and young women on Pace. Does it sound to you like a place where the young men are very romantic, formally asking their prospective girlfriends out on dates, paying the expenses of those dates, bringing their girls flowers and gifts, and treating them like princesses, OR do you expect that relationships are less romantic, where dating couples each pay half, and where romantic things like young men bringing flowers and gifts is not done.

Please answer question 5 NOW.

Voice 1: Another thing we did not cover in our description of Pace Island was how stable marriages are. Think for a moment about the characteristics of that island culture that we have described above, and indicate whether the characteristics of that island culture that we have described above, and indicate whether you imagine that marriages are very stable, with most lasting 'until death do us part' or unstable, with many ending in divorce. We know this is not an easy judgment, but we have given you some hints: Please answer question 6 NOW.

RESEARCHER: SHUT OFF THIS RECORDER NOW.

APPENDIX P

Study Two Dependent Variable Items

CULTURAL AWARENESS AND PERSONALITY: QUESTIONNAIRE

PLEASE WAIT FOR THIS QUESTION TO BE READ TO YOU BEFORE
ANSWERING.

I would

1. ____ urge her to become a science writer
2. ____ urge her to be a writer, but to remain open to the marriage option
3. ____ suggest she be a writer, but also that she consider marriage instead
4. ____ suggest she choose marriage/motherhood, but also consider being a writer
5. ____ urge her to choose marriage/motherhood, but remain open to being a writer
6. ____ urge her to choose marriage/motherhood

AGAIN, PLEASE WAIT FOR THE QUESTION:

Her mother would

1. ____urge her to become a science writer
2. ____urge her to be a writer, but to remain open to the marriage option
3. ____suggest she be a writer, but also that she consider marriage instead
4. ____suggest she choose marriage/motherhood, but also consider being a writer

5. ____urge her to choose marriage/motherhood, but remain open to being a writer
6. ____urge her to choose marriage/motherhood

PLEASE ANSWER THIS NEXT QUESTION RIGHT AWAY, WITHOUT WAITING
FOR NEW INSTRUCTIONS:

Her father would

1. ____urge her to become a science writer
2. ____urge her to be a writer, but to remain open to the marriage option
3. ____suggest she be a writer, but also that she consider marriage instead
4. ____suggest she choose marriage/motherhood, but also consider being a writer
5. ____urge her to choose marriage/motherhood, but remain open to being a writer
6. ____urge her to choose marriage/motherhood

PLEASE WAIT FOR THE QUESTION TO BE READ:

It would be best for Pace Island if

1. ____the young women like Naomi all chose career paths
2. ____most young women like Naomi chose career paths
3. ____a slight majority of young women like Naomi chose career paths
4. ____a slight majority of young women like Naomi chose marriage and motherhood
5. ____most young women like Naomi chose marriage and motherhood
6. ____they all chose marriage and motherhood

PLEASE WAIT FOR THE QUESTION TO BE READ TO YOU:

Pace Island is probably a place that is:

Extremely romantic :____:____:____:____:____:____: Extremely UNromantic

PLEASE WAIT FOR THE QUESTION TO BE READ:

Pace Island marriages probably are:

Extremely stable :____:____:____:____:____:____: Extremely UNstable

PLEASE CONTINUE ANSWERING ALL OF THE REMAINING QUESTIONS NOW.

For questions 7 & 8 assume that Naomi chooses to marry, have kids, and be a home

maker and NOT to become a writer:

As a mother/home maker, over the majority of the remainder of her life, how happy do you expect that Naomi will be?

Not at all happy :____:____:____:____:____:____: Extremely happy

How much will typical people in her community value Naomi in her role of mother/home maker?

Not at all valued :____:____:____:____:____:____: Extremely valued

For questions 9 & 10 assume that Naomi chooses to go the college, and then to return to Pace Island in the professional role of science writer:

As a science writer, over the majority of the remainder of her life, how happy do you expect that she will be?

Not at all happy :____:____:____:____:____:____: Extremely happy

How much will typical people in her community value Naomi in her role of science writer?

Not at all valued :____:____:____:____:____:____: Extremely valued

THANKS MUCH! YOU ARE DONE WITH THIS QUESTIONNAIRE, PLEASE
SIGNAL THE RESEARCHER THAT YOU ARE DONE BY PUTTING DOWN YOUR
PENCIL AND LOOKING UP.

APPENDIX Q

Study Two Post-Research Questionnaire

The study is now almost over. Please be as honest as you can in responding to this questionnaire, answering the questions concerning ideas you may have had about this research before you began filling out this form. The time you have spent so far in this research will have value only if you are careful and honest in filling out this form.

Please circle answers.

1. Has anyone other than the researchers told you anything about this study before you came here?

no yes

go to 3 go to 2

2. What had you been told before coming here today? _____

_____ go to 3.

3. Before starting this form, did you develop any ideas that this study was about something other than what the researchers described to you?

no yes

go to 5 go to 4

4. What were those ideas?_____

_____go to 5.

5. As you decided on your recommendations for Naomi did you suspect that we were trying to influence your decisions by what we told you about Pace Island?

| | | | |
|---------|------------|------------|------------|
| No | slightly | moderately | very |
| Go to 8 | suspicious | suspicious | suspicious |
| | go to 6 | go to 6 | go to 6 |

6. What were those suspicions?_____

_____go to 7

7. When did you develop those suspicions?

| | | |
|------------------|------------------|---------------|
| While “advising” | After “advising” | While working |
| Naomi | Naomi | on this form |

THANKS! PLEASE TELL THE RESEARCHER THAT YOU ARE DONE.

APPENDIX R

Study Two Debriefing

DEBRIEFING FOR PERSONALITY AND CAREERS

Thanks much for your participation today.

The purpose of this research was to investigate an interesting theory by Marcia Guttentag and Paul Secord* that the ratio of men to women in any culture is a powerful determinant of many of the features of that culture. In short, they proposed that a culture with an excess of men tends to be very traditional in many ways, but particularly in assigning typical masculine occupational roles only to men. On the other hand, cultures with too many women tend to encourage women to explore many non-traditional paths of life (i.e., doing things other than being wives and mothers).

The primary purpose of this study was to investigate whether cultures that have an excess of men or an excess of women lead participants to recommend different careers for women. You listened to a description of an Island culture that described Pace Island as having either too many men, or as having too many women. Thus you see that there were two different conditions. We expected that those two conditions might affect the roles that you thought would be most appropriate for Naomi. We expected, for example, that if you heard that Pace Island had an excess of men (i.e., men outnumber women by a noticeable amount) that you would recommend that Naomi consider her role as a wife and mother, and you would expect that Naomi would be very happy in those traditional roles. On the other hand, if you heard that Pace Island had an excess of women then you

would be more likely to have encouraged Naomi to become a science writer.

This study was also about the interaction of personality (your long-term traits) and those decisions. Specifically we thought that people higher in openness might recommend less traditional occupations for Naomi.

We won't know how that worked out until a few weeks from now. We hope that your participation and this feedback has been a learning experience for you. We sincerely thank you for your participation.

If you have any further questions about the research or your scores, feel free to contact either of the investigators listed below.

Richard A. Dienstbier

Email: rad@unlserve.unl.edu

Elizabeth A. Boger

Email: eboger@unlserve.unl.edu

*Guttentag, M., & Secord, P. F. (1983). *Too many women? The sex ratio question*. Beverly Hills, CA: Sage Publications.

APPENDIX S

Study Three Informed Consent

Consent to Participate (2 Credits)

Personality, Culture & Careers

The purpose of this study is to explore the relationships between personality, culture and how you look at career choices. You are invited to participate in this research because you are presently enrolled in a psychology course at the University of Nebraska-Lincoln and you are at least 19 years old, or if under 19, then you have parental permission for research participation.

This study will be conducted in the Department of Psychology in Burnett Hall at UNL. This study will take about one hour. During that time you will complete some standard demographic and personality questionnaires, listen to a description of a society and answer some cultural and career questions about the society as well as ‘as if’ you were a member of that society.

There are no known risks or discomforts associated with this research. However, in the event of problems resulting from participation in this study, psychological treatment is available at the UNL Psychological Consulting Center, telephone (402) 472-2351.

You understand that this study is not designed to help you personally, but that the information gained from this project will contribute to our knowledge of personality and decisions. However, you will learn how research of this type is conducted.

Instead of participating in this study, you may participate in other studies or activities that are approved for extra credit by your instructor.

Any information obtained during this study that could identify you will be kept strictly confidential. Informed consent forms and Experimetrix participant lists will not be kept with your individual data. All data from this study will be stored in a secure room in Burnett Hall for three years after the study is completed. When completed, results from this research may be presented at scholarly conferences and/or published journals in summary form, but no individuals will be identified in those presentations or reports.

You will receive credits for participating for one hour in this research, provided you complete all research materials. If you fail to complete the materials we will not be able to use your data, and therefore no experimental credit will be given.

You may ask questions of the researcher about the research and have those questions answered before agreeing to participate, or during the research. If you have research questions you may call the researchers at any time at the phone numbers listed at the bottom of this form. If you have any questions about your rights as a research participant that have not been answered by the researchers or to report any concerns about this study, you may contact the University of Nebraska-Lincoln Institutional Review Board, telephone (402) 472-6965.

You are free to decide not to participate in this study or to withdraw at any time without affecting your relationship with the researchers, your instructor, or with UNL. Your decision will not result in any loss of benefits to which you are otherwise entitled. You are voluntarily making a decision whether or not to participate in this research study.

Your signature certifies that you have decided to participate having read and understood the information presented. You will be given a copy of this form to keep.

Participant Signature

Date

Elizabeth A. Boger, Principal Investigator, 472-3492

Richard A. Dienstbier, Secondary Investigator, 472-3723

APPENDIX T

Study Three Left-Handedness Figure

Figure 2

| Left-handedness in the United States and on Pace Island | | |
|---|---------------|-------------|
| | United States | Pace Island |
| Left-Handed | 12% | 43% |
| Right-Handed | 87% | 24% |
| Ambidextrous | 1% | 23% |
| | | |

APPENDIX U

Study Three Age of Puberty Figure

Figure 3

| Average Age of Puberty for Boys and Girls in the United States and on Pace Island | | |
|--|------|-------|
| | Boys | Girls |
| United States | 14 | 12 |
| Pace Island | 16 | 14 |
| | | |

APPENDIX V

Study Three Script

Male Voice: Greetings. We are going to tell you about Pace Island and ask you to imagine yourself living there. Then we're going to ask you some questions about how you think you would fit in there. As you listen to descriptions of the Island, you do not need to memorize any facts or figures.

Female Voice: To simplify that, we have given you some graphs to illustrate the facts and figures that you might want to have on hand when it is time to answer questions about Pace Island. That sheet of graphs should be on your desk now.

M: For now, just listen and try to visualize Pace Island. Like Hawaii, Pace Island is a volcanic island that was settled by Polynesian people at least a thousand years ago. Although the Polynesian culture flourished there for hundreds of years, like all such places Pace changed after explorers and workers arrived and settled on Pace in the 1800s.

F: Today, some citizens of Pace Island look Polynesian, some look Asian, some look African, some look European, and some look as if they could have come from Lincoln, Nebraska. Thus most students at UNL would find it easy to blend in on Pace Island. Some of the people there will probably look like people from your own family.

M: I don't know. If they look like people from my family they might want to avoid

mirrors.

F: Very funny. The point is, it's a really diverse culture.

M: Right.

F: Pace Island is only 90 miles long and 35 miles wide, and it has a population that is about three-fourths as many people as live in Lincoln. Pace is located approximately 1000 miles west of, and somewhat north of, Hawaii. The relative isolation of Pace means that people who grow up on Pace generally stay there, and although Pace was settled by people from many parts of the world, Pace no longer attracts immigrants or tourists from outside. Perhaps that is because its climate is not as tropical as many other islands of the Pacific.

M: And it's too isolated to swim there, especially from Lincoln. Please look at Figure 1 on the sheet of Figures on your desk. Figure 1 shows the approximate location of Pace in the Pacific Ocean. (PAUSE 5 SECONDS)

F: Currently Pace has a culture that reflects its developing economy. Some citizens still make their living in traditional ways, by fishing and raising crops. The schools are generally good and there is a junior college that allows high school graduates of Pace to either learn a job skill or take college-preparatory courses.

M: And there is a small college on Pace. After College, if they do go elsewhere to study for advanced degrees at Universities, because of family ties and because Pace Island feels like home, most Pace islanders come back to Pace to live and work.

F: So, although Pace is small, it has a thriving economy with adequate educational opportunities. And there are ample employment opportunities in the growing economy of Pace for those who have graduated from high school, junior college, or the College. The usual array of doctors, lawyers, teachers, plumbers, bakers, sales people, and car dealers live and do business on Pace.

M: Because people can commute to work electronically, it is possible to work from one's own home for companies in other parts of the world, and that too allows Pace Islanders to live on their home island.

F: There are a number of unusual features about Pace Island and about the culture and the people of Pace Island that we want to tell you about.

M: So far Pace Island probably looks pretty normal, but there are some unusual features that are more interesting. First of all, there is a much higher percentage of people who are either left-handed or ambidextrous.

F: You'd better tell what ambidextrous means.

M: Those are people who are neither right-handed nor left-handed, but can do things equally well with either hand. But that means they may be equally clumsy with either hand, too.

F: OK, very funny, but we're losing the main point. In most populations of people the vast majority are right-handed, but on Pace Island, when you add the left-handed people and the ambidextrous people, they actually outnumber the right-handed people. That's very unusual. Turn to Figure 2 and you can see the percentages of right-handed and left-handed and ambidextrous people on Pace Island compared to similar figures for people in the United States. (PAUSE 5 SECONDS)

M: Why? Why so many left-handed and ambidextrous people?

F: Well, it is apparently genetic, because Pace Island parents do not train their kids to be lefties. It seems to be something unique in the population of Polynesian people that first settled the island; and then when other peoples came to Pace in the 1800s they typically intermarried with the Polynesian people, because this tendency to have more lefties seems to be a general one.

M: Do you suppose that the Pace Islanders' attractiveness is related to left-handed tendencies? We lefties are way better looking than the rest of you folks, you know.

F: I don't think so. Nice try, though. Who said anything about attractiveness, anyway?

You just assumed that because they were Polynesian people that they would be good looking. But seriously, being more often left-handed does imply that Pace Islanders are different than other people.

M: That's true. Many of you listening probably know that the right hemisphere of the brain controls the left side of the body. So, being left-handed implies that the right hemisphere is more dominant. Since the right side of the brain processes emotion and spatial relationships, it may mean that Pace Islanders have unusual skills in these areas.

F: Good. I'm hoping to find that as a lefty that I have some unusual skills in something. I'll keep looking.

M: Another interesting feature of Pace Island culture is that Pace Islanders seem to mature more slowly than people in other economically developed cultures. Pace Islanders enter puberty almost two years later. Please turn to Figure 3 in your booklet to see average ages for entering puberty for Pace Islanders, compared to comparable figures from the United States. (PAUSE 5 SECONDS)

F: Although later puberty is often associated with poor nutrition, that is clearly not the case on Pace Island, because the volcanic soil is really very good for growing many vegetable crops and for fruit growing, and the Pace Islanders eat more fish than red meat, so their diet is both plentiful and really healthy.

M: Do you suppose there is less teenage angst and combat between teens and parents on Pace when they start puberty at 14 or 15 instead of 12 or 13?

F: Actually, that's an interesting question. We know from research in the US and Europe that girls who mature later generally have fewer psychological and behavioral problems than girls who enter puberty early, but I don't think this issue has been studied on Pace Island. Perhaps we could get a grant to go study that.

M: hat would be cool. Off we go to a Pacific Island, but just for science of course.

F: Another feature of the people of Pace is that they're faster than other people.

M: Sexually? Is this another reason for me to want to go there?

F: No, not sexually. They run faster. They're sprinters rather than distance runners.

M: This is one of those curious things. Tell our good listeners more about that.

F: Every two years for about he last century, the islands within about 500 miles of Pace get together on one of their islands for a festival that includes all kinds of races and contests. There are canoe races, kayak races, tree climbing, and a lot of the sports that are now part of the Olympics, from sprint races through marathons.

M: And the Pace runners win the sprints. Obviously not all the time, but disproportionately over the years they dominate the short distance running events.

F: Yeah, including the hurdles and everything up through the 400-meter distances, but they don't tend to excel at the distance runs or the other endurance events.

M: At first you'd think this was just that they trained harder for those shorter distances featuring raw speed, but in fact no one really works out much for these games. The people treat these between-island get-togethers much more like festivals. They go to have fun and to see old friends and relatives, not to win a new t-shirt for capturing the 200-meter crown.

F: So of course the question comes up again: Is this nutrition or genetic or because of some lifestyle difference between Pace people and other islanders?

M: And the answer is the same as for the handedness thing. In the absence of any other plausible explanation for being so fast, it looks like it is probably genetic, but it's so unimportant that it certainly has not been studied a lot. It's just a curiosity.

-----Condition too many women-----

F: Okay, so we don't know the answer to that question. So, let's move on to another curious feature of pace Island: Specifically, fewer men than women live on Pace Island.

In literally all age groups, there are only 10 males for every 15 females.

M: Is that something that would be readily noticed?

F: Oh yes. On a walk through the middle of any town on the island, you would notice the shortage of men. Even in church, the choirs have very few men.

M: Has it always been like that?

F: That shortage of men dates back many generations. Folk stories that have been passed across the generations mention shortages of boys and men. When 18th century explorers noticed that men were scarce compared to women, it was assumed then that many men may have died early as a result of fishing accidents or that certain tropical diseases killed boys and men more readily than girls and women. But that does not seem to be the case, because birth records confirm that in a typical year, only 10 boys are born for every 15 girls.

M: Okay, if not accidents or disease, why are there more women than men on Pace?

F: By elimination, the only reasonable modern explanation is that the cause of so few boy babies must be genetic. Even after peoples from other cultures and races have come to Pace Island and mixed their genes in with those of the original population, the situation remains. It can be seen one of two ways: either too few men or too many women.

Please look at Figure 4. Notice that across the last 80 years, since accurate records have been available, that compared to women, men have been continuously in short supply on Pace Island (PAUSE 5 SECONDS)

M: That means, of course, that Pace Island men have lots of choices when they are looking for a woman.

F: Now that you've figured that out I suppose you'll be packing your bags and heading to Pace soon, so you can enjoy the company of lots of extra women.

M: (slowly) Oh, that's really tempting. But seriously, it must be interesting for men on Pace to perceive that they have lots of choices of women, but for the women to realize that there really are not enough men to go around. Hmm. Easy for the men, but hard for the women.

----Condition too many men----

F: Okay, so we don't know the answer to that question.

M: So, let's move on to another curious feature of pace Island: Specifically, fewer women than men live on Pace Island. In literally all age groups, there are only 10 females for every 15 males.

F: Is that something that would be readily noticed?

M: Oh yes. On a walk through the middle of any town on the island, you would notice the shortage of women. Even in church, the choirs have very few women.

F: Has it always been like that?

M: That shortage of women dates back many generations. Folk stories that have been passed across the generations mention shortages of girls and women. When 18th century explorers noticed that women were scarce compared to men, it was assumed then that many women may have died child birth or that certain tropical diseases killed girls and women more readily than boys and men. But that does not seem to be the case, because birth records confirm that in a typical year, only 10 girls are born for every 15 boys.

F: Okay, if not accidents or disease, why are there more men than women on Pace?

M: By elimination, the only reasonable modern explanation is that the cause of so few girl babies must be genetic. Even after peoples from other cultures and races have come to Pace Island and mixed their genes in with those of the original population, the situation remains. It can be seen one of two ways: either too few women or too many men.

Please look at Figure 4. Notice that across the last 80 years, since accurate records have been available, that compared to men, women have been continuously in short supply on Pace Island (PAUSE 5 SECONDS)

F: That means, of course, that Pace Island women have lots of choices when they are looking for a man.

M: Now that you've figured that out I suppose you'll be packing your bags and heading to Pace soon, so you can enjoy the company of lots of extra men.

F: (slowly) Oh, that's really tempting. But seriously, it must be interesting for women on Pace to perceive that they have lots of choices of men, but for the men to realize that there really are not enough women to go around. Hmm. Easy for the women, but hard for the men.

-----Resume standard script-----

F: Another interesting facet of the culture on Pace Island is that adult men pride themselves on their rich, luxurious facial hair.

M: Oh, really? I would have thought that a people of Polynesian descent would have difficulty growing lots of facial hair.

F: Remember, Pace Island has been settled by peoples from many parts of the world, including Europeans. No one knows for sure if this tradition of growing thick, full beards and mustaches originated on Pace or was brought to the Island with one of the waves of

settlers, but today very few adult men on Pace shave their faces bare.

M: I wonder if Pace Islanders hold beard and mustache competitions like people in Europe and the US?

F: As a matter of fact, the various towns on Pace Island hold friendly competitions for that very thing.

M: You know, Pace Island is sounding better and better.

F: Okay, now we're going to ask you, the listener, some questions about Pace Island. Please wait for each question to be read to you.

M: For the next few questions, think about life on Pace Island.

F: How likely are Pace Islanders to be farmers? (PAUSE 5 SECONDS AFTER EACH QUESTION)

M: How likely are Pace Islanders to be factory workers?

F: How likely are Pace Islanders to be teachers?

M: How likely are Pace Islanders to be politicians?

F: How likely are Pace Islanders to be laborers?

M: How likely are Pace Islanders to be artists?

F: How likely are Pace Islanders to be writers?

M: How likely are Pace Islanders to be lawyers?

F: How likely are Pace Islanders to be police officers?

M: Who is most likely to ask a potential partner out on a date?

F: Who is most likely to initiate a relationship?

M: Who is most likely to pay for dates?

F: How likely is it that Pace Islanders bring potential partners romantic gifts like flowers and candy?

M: Who on Pace Island is most likely to find someone to marry?

F: How stable are marriages on Pace Island?

M: Who on Pace Island is most likely to be happy as a homemaker?

F: Who on Pace Island is most likely to be happy working outside the home?

M: Now, for the next questions, try to imagine that you were born and grew up on Pace Island. Answer the following questions as though you are a Pace Islander.

F: As a Pace Islander, how likely are you to be a farmer?

M: As a Pace Islander, how likely are you to be a factory worker?

F: As a Pace Islander, how likely are you to be a teacher?

M: As a Pace Islander, how likely are you to be a politician?

F: As a Pace Islander, how likely are you to be a laborer?

M: As a Pace Islander, how likely are you to be an artist?

F: As a Pace Islander, how likely are you to be a writer?

M: As a Pace Islander, how likely are you to be a lawyer?

F: As a Pace Islander, how likely are you to be a police officer?

M: Living on Pace Island, how easy would it be for you to find someone to date?

F: Living on Pace Island, how likely would it be for you to initiate a relationship?

M: Living on Pace Island, how likely would it be for you to pay for your dates?

F: Living on Pace Island, how likely would it be for you to bring candy and flowers to your dates?

M: Living on Pace Island, how easy would it be for you to find someone to marry?

F: Living on Pace Island, how stable would your relationships be?

M: Living on Pace Island, how happy would you be as a homemaker?

F: Living on Pace Island, how happy would you be working outside the home?

M: Researcher, end recording.

APPENDIX W

Study Three Dependent Variable Answer Sheet

PLEASE WAIT FOR EACH QUESTION TO BE READ TO YOU BEFORE
ANSWERING

1. Extremely Likely :____:____:____:____:____:____: Extremely UNlikely

2. Extremely Likely :____:____:____:____:____:____: Extremely UNlikely

3. Extremely Likely :____:____:____:____:____:____: Extremely UNlikely

4. Extremely Likely :____:____:____:____:____:____: Extremely UNlikely

5. Extremely Likely :____:____:____:____:____:____: Extremely UNlikely

6. Extremely Likely :____:____:____:____:____:____: Extremely UNlikely

7. Extremely Likely :____:____:____:____:____:____: Extremely UNlikely

8. Extremely Likely :____:____:____:____:____:____: Extremely UNlikely

9. Extremely Likely :____:____:____:____:____:____: Extremely UNlikely

10. Men :_____:_____:_____:_____:_____:_____: Women

11. Men :_____:_____:_____:_____:_____:_____: Women

12. Men :_____:_____:_____:_____:_____:_____: Women

13. Extremely Likely :_____:_____:_____:_____:_____:_____: Extremely UNlikely

14. Men :_____:_____:_____:_____:_____:_____: Women

15. Extremely Stable :_____:_____:_____:_____:_____:_____: Extremely UNstable

16. Men :_____:_____:_____:_____:_____:_____: Women

17. Men :_____:_____:_____:_____:_____:_____: Women

AGAIN, PLEASE WAIT FOR EACH QUESTION TO BE READ TO YOU BEFORE
ANSWERING

18. Extremely Likely :_____:_____:_____:_____:_____:_____: Extremely UNlikely

19. Extremely Likely :_____:_____:_____:_____:_____:_____: Extremely UNlikely

20. Extremely Likely :____:____:____:____:____:____: Extremely UNlikely

21. Extremely Likely :____:____:____:____:____:____: Extremely UNlikely

22. Extremely Likely :____:____:____:____:____:____: Extremely UNlikely

23. Extremely Likely :____:____:____:____:____:____: Extremely UNlikely

24. Extremely Likely :____:____:____:____:____:____: Extremely UNlikely

25. Extremely Likely :____:____:____:____:____:____: Extremely UNlikely

26. Extremely Likely :____:____:____:____:____:____: Extremely UNlikely

27. Extremely Easy :____:____:____:____:____:____: Extremely Difficult

28. Extremely Likely :____:____:____:____:____:____: Extremely UNlikely

29. Extremely Likely :____:____:____:____:____:____: Extremely UNlikely

30. Extremely Likely :____:____:____:____:____:____: Extremely UNlikely

31. Extremely Easy :____:____:____:____:____:____: Extremely Difficult

32. Extremely Stable :_____:_____:_____:_____:_____:_____: Extremely UNstable

33. Extremely Happy :_____:_____:_____:_____:_____:_____: Extremely UNhappy

34. Extremely Happy :_____:_____:_____:_____:_____:_____: Extremely UNhappy

APPENDIX X

Study Three Post-Research Questionnaire

The study is now almost over. Please be as honest as you can in responding to this questionnaire, answering the questions concerning ideas you may have had about this research before you began filling out this form. The time you have spent so far in this research will have value only if you are careful and honest in filling out this form.

Please circle answers.

1. Has anyone other than the researchers told you anything about this study before you came here?

no yes

go to 3 go to 2

2. What had you been told before coming here today? _____

_____ go to 3.

3. Before starting this form, did you develop any ideas that this study was about something other than what the researchers described to you?

no yes

go to 5 go to 4

4. What were those ideas?_____

_____go to 5.

5. As you decided on your answers to the questions about Pace Island did you suspect that we were trying to influence your decisions by what we told you about Pace Island?

| | | | |
|---------------|------------|------------|------------|
| No | slightly | moderately | very |
| (skip to end) | suspicious | suspicious | suspicious |
| | go to 6 | go to 6 | go to 6 |

6. What were those suspicions?_____

_____go to 7.

7. When did you develop those suspicions?

| | | |
|-----------------|-----------------|---------------|
| While answering | After answering | While working |
| the questions | the questions | on this form |

THANKS! PLEASE TELL THE RESEARCHER THAT YOU ARE DONE.

APPENDIX Y

Study Three Debriefing

DEBRIEFING FOR PERSONALITY AND CAREERS

Thank you for your participation today.

The purpose of this research was to investigate an interesting theory by Marcia Guttentag and Paul Secord* that the ratio of men to women in any culture is a powerful determinant of many of the features of that culture. In short, they proposed that a culture with an excess of men tends to be very traditional in many ways, but particularly in assigning typical masculine occupational roles only to men. On the other hand, cultures with too many women tend to encourage women to explore many non-traditional paths of life (i.e., doing things other than being wives and mothers).

The primary purpose of this study was to investigate whether cultures that have an excess of men or an excess of women lead participants to recommend different careers for people, particularly women. You listened to a description of an island culture that described Pace Island as having either too many men or as having too many women. Thus you see that there were two different conditions. We expected that those two conditions might affect the roles that you thought would be most appropriate for women. We expected, for example, that if you heard that Pace Island had an excess of men (i.e., men outnumber women by a noticeable amount) that you would recommend that women consider the roles of wife and mother, and you would expect that women would be very happy in those traditional roles. On the other hand, if you heard that Pace Island had an

excess of women then you would be more likely to have encouraged women to choose less traditional roles.

This study was also about the interaction of personality (your long-term traits) and those decisions. Specifically we thought that people higher in openness might recommend less traditional roles for women.

We won't know how that worked out until a few weeks from now. We hope that your participation and this feedback has been a learning experience for you. We sincerely thank you for your participation.

If you have any further questions about the research or your scores, feel free to contact either of the investigators listed below.

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*Guttentag, M., & Secord, P. F. (1983). Too many women? The sex ratio question. Beverly Hills: Sage Publications.

VITA

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This manuscript was prepared by the author.